XUM

...NOLOGY DEPT.

the OIL AND GAS JOURNAL

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What Hughes field service means

Good service, to us, means *anticipation* of your needs *at the rig*.

Hughes Tool field men keep in constant personal touch with every rig in their territory, consulting with pushers, drillers and other field personnel on rock-bit performance and requirements.

The Hughes service organization consistently covers all of the active oil fields in the U. S. and Canada wherever you find rotary drilling. Hughes men visit more rigs more times. This vigilant Hughes service anticipates rock-bit requirements to insure having the *right bit* at the *right time*.

Hughes TRI-CONE Rock Bits

PRICE 50 CENTS TABLE OF CONTENTS PAGE 37 MARCH 15, 1951

XUM

YOUR LANE-WELLS MAN CAN GIVE YOU ALL THESE ANSWERS ON PACKERS!

1. DO I NEED A PACKER?

Analysis of well conditions often reveals that a packer, though applicable, would be less desirable than some other piece of equipment. Lane-Wells men recommend the tool best suited to your needs.

2. WHAT CAN PACKERS DO FOR ME?

Operators are sometimes surprised to find how wide a variety of oil field operations packers perform. Lane-Wells men can work out with you packer settings for a range of down-the-hole jobs.

3. WHICH PACKER IS RIGHT FOR THIS JOB?

Most operators are aware that different types of packers can be used—but only one is really right for the job. Your Lane-Wells field man can help you select that one right packer.

4. HOW TO SET THIS PACKER?

There are at least 15 different factors which must be taken into account to assure a proper packer setting. Lane-Wells field men lay out packer settings on which you can rely.

5. HOW ABOUT PULLING A PACKER?

Pulling a packer involves as many factors as setting. Your Lane-Wells packer expert plans procedures which pull packers efficiently.

6. HOW TO GET THE MOST FROM A PACKER.

Your Lane-Wells man can review your packer programs, tell you how to evaluate their efficiency, and show you what to expect from a packer.

7. IS THIS PACKER STILL GOOD?

Many used packers have been saved for further service by Lane-Wells field men, who can advise on proper maintenance and on both field and shop repair and reconditioning.

Ask Your

LANE-WELLS MAN

NOW

...and get ALL the ANSWERS!

This Service is FREE!

LANE WELLS

TECHNICAL OILFIELD SERVICES

XUM

The S. S. *Jahra* on her delivery trials.

Supertankers for Superservice

The *S. S. Jahra,* first of more than a score of 28,000-ton supertankers constructed by Bethlehem shipbuilding yards for private interests in the past two years, is an outstanding example of Bethlehem's ability to design and construct ships to meet the specific requirements of the individual operator or of an entire industry.

These vessels represent fulfillment of the petroleum industry's need for big, fast, highly-efficient carriers capable of transporting oil products to and from the far-flung corners of the globe on a low-cost basis.

Fully representative of American postwar shipbuilding skill and achievement, these supertankers can be expected to provide many years of high-standard and low-cost service for their operators, because they have all of the inherent characteristics which for almost half a century have distinguished every ship bearing the title, "Bethlehem-Built."

MAIN PARTICULARS OF THE S. S. JAHRA

Length, overall	624 ft. 9¾ in.
Length, between perpendiculars	595 ft. 0 in.
Breadth, molded	84 ft. 0 in.
Depth, molded	44 ft. 0 in.
Draft, molded	33 ft. 0 in.
Deadweight, tons	28,300
Cargo capacity, bbls.	240,400
Shaft horsepower, max.	13,750
Speed, fully loaded, about	16½ knots

SHIP REPAIR YARDS

Boston Harbor	New York Harbor
Baltimore Harbor	Beaumont, Texas
Los Angeles Harbor	San Francisco Harbor

SHIPBUILDING YARDS

Quincy, Mass.	Staten Island, N. Y.
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SHIPBUILDERS *SHIP REPAIRERS*

BETHLEHEM STEEL COMPANY

Shipbuilding Division

General Offices: 25 Broadway, New York 4, N. Y.

On the Pacific Coast shipbuilding and ship repairing are performed by the Shipbuilding Division of Bethlehem Pacific Coast Steel Corporation

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.

XUM

UNION OIL COMPANY
cuts cylinder wear, lengthens service of equipment with...

...KOPPERS *K-Spun* Porous Chrome* PISTON RINGS

Union Oil Company's newly modernized Avila (California) Terminal utilizes three 460 h.p. Enterprise dual-fuel engines with single-stage Ingersoll-Rand SHV centrifugal pumps. Engines are 6 cylinder, 12" bore, 15" stroke, 4 cycle, 450 rpm, non-supercharged. Each piston is fitted with two Porous Chrome, three tapered and two oilcutter Koppers Piston Rings.

Koppers K-Spun Piston Rings, produced by an exclusive centrifugal casting process, are 100% stronger and four times more resistant to combustion shock than ordinary cast iron rings, and will not break in installation or in service.

Koppers Porous Chrome Rings have a porous chrome surface that holds and distributes oil during break-in, quickly wears down to perfectly seated solid chrome that prevents grit and other particles from embedding in the ring surface where they can scratch cylinder walls. Porous Chrome Rings last up to four times as long as other rings, reduce cylinder wear 50% or more.

That's why hundreds of companies like Union Oil are reporting amazing savings in equipment and maintenance costs through the use of Koppers Rings. Remember . . . we make rings for *anything* that uses piston rings.

If you have a piston ring problem, why not get the *right* answer from us? Write, wire or phone KOPPERS CO., INC., *Piston Ring Dept.*, 1553 Hamburg St., Baltimore 3, Maryland.

KOPPERS

KOPPERS
AMERICAN HAMMERED
PISTON RINGS

*VAN DER HORST PROCESS

ONLY KOPPERS CAN FURNISH K-SPUN OR POROUS CHROME!

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Five grommet V belts doing the work of 8

B. F. Goodrich grommet V belts cut costs 20 to 50%

THIS is actually an 8-belt drive but a plant accident damaged three of the belts and the engineers decided to let the remaining five belts run and see what happened. They've done the job perfectly because they're B. F. Goodrich grommet V belts — here's where that extra strength comes from:

No cord ends — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet! — No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B. F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY

B.F.Goodrich

RUBBER FOR INDUSTRY

REFLECTIONS . . . show the extreme accuracy of honing which gives mirror finish to "Oilwell" DI-HARD LINERS.

DI-HARD . . . your best buy in Slush Pump Liners!

BEST...by field test!

"OILWELL" engineers have completed a series of liner field tests which add evidence to the contention that abrasion resistance results from low coefficient of friction as well as from surface finish and hardness.

In "Oilwell" No. 14P-HD and No. 20-P duplex power pumps, DI-HARD liners were placed in one side while induction hardened companion liners (of corresponding 60-67 hardness range on the Rockwell "C" scale) were used in the opposite side.

The tests (three for each pump size) were made on pumps in regular field service . . . under as wide a range of drilling conditions as possible. In ALL SIX TESTS, the "Oilwell" DI-HARD liners out-performed induction hardened liners. Your "Oilwell" Representative has all the facts and will gladly give you the details.

CONCLUSION:

Since the hardness and mirror finish of both DI-HARD and these induction hardened liners were practically identical, it becomes evident that the ability of metal to resist wear and corrosion is dependent upon other factors as well as hardness.

DI-HARD has the lowest coefficient of friction of any known metal suitable for liner applications and is more resistant to wear by a corresponding degree. If you are using any other liners in your "Oilwell" pumps, switch to DI-HARD and learn for yourself how much "extra service" they give.

ASK . . . your "Oilwell" Representative for your copy of our recent Slush Pump Fluid End Parts booklet . . . and keep your "Oilwell" pumps "OILWELL" for outstanding service.

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LOS ANGELES, CALIFORNIA

USS "OILWELL" TRADE MARK

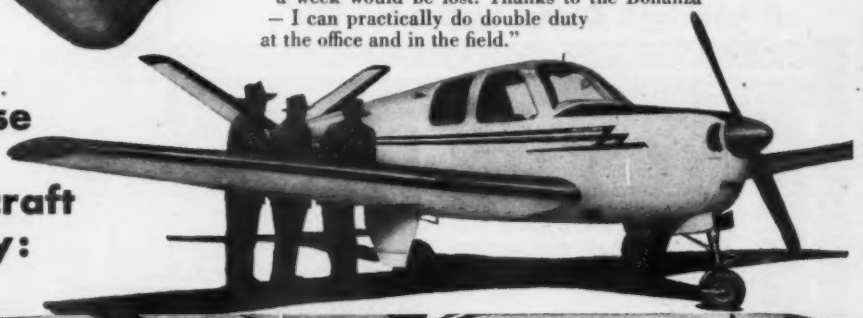
UNITED STATES STEEL

"R. D. Ezell must be twins!"

So say branch managers about the executive vice president and general manager of the Roy C. Whayne Supply Co. at Louisville. It's because Mr. Ezell really gets around since his company acquired a Beechcraft Bonanza.

The Whayne Supply Co. operates a huge road machinery business, with branches in Evansville, Indiana; Ashland and Paducah, Kentucky, so plenty of field trips are needed. "The Bonanza is a marvelous engineering achievement — completely dependable, rugged, and fast. I make this trip to all three branches and am away from Louisville only one night. By other means of transportation a week would be lost. Thanks to the Bonanza — I can practically do double duty at the office and in the field."

Check these reasons for Beechcraft superiority:



B

C

A ROOM APLENTY for four big men in the spacious cabin. Front seats even more comfortable; new two-position reclining rear seat. Color and upholstery styling all new, too.

B SAFETY—RUGGEDNESS. Low, cross-braced landing gear is wide and long. Rough landings are smoothed. In flight you cruise, using only 65% of the engine's rated take-off power. *Extra* safety margin!

C SPEED and top performance. Take-off horsepower now 205 at 2,600 rpm; new Beechcraft metal propeller has greater aerodynamic efficiency. Short fields no problem! And there's greater economy in fuel consumption, too.

- For full details on the new Model C35 Bonanza, see your Beechcraft distributor, or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.
- Higher top speed: 190 mph
- Higher cruising speed: 175 mph
- Longer range: 775 miles
- Better fuel economy: 19.9 mpg

Beechcraft

BONANZA

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

Big Boats net the Big Hauls

Petroleum Progress Serves One of America's Oldest Industries

Big hauls don't come in small boats. And the big hauls are not within rowing distance! Commercial fishing is big business. It demands rugged, fully-powered boats that can search the seas—go where the fish are—take aboard huge catches—bring them back to shore, fast!

Fish must be found, caught and brought to market quickly—to be cut into fillets, quick-frozen, smoked or canned. Petroleum fuels and lubricants have helped to bring this operating efficiency to the fishing industry.

SUPPLYING sufficient food for America and the world outstripped the capacity of individual manpower. Again petroleum contributed to a vital need—stepping up productivity with motor power. Today reaping huge crops on land and at sea has become highly mechanized. As a farmer ploughs his land and reaps his harvest—so does a modern, power vessel plough the sea, probe the ocean floor, net its catch.

In every U. S. coastal area Texaco supplies these sturdy fishing boats with fuels and lubricants.

Here is one more example of petroleum research and development serving industry—making it possible to supply a vital commodity in enormous quantities, for essential food, for commercial uses.

THE TEXAS COMPANY

Petroleum Promotes Progress

TEXACO

Pressure-Seal Bonnet Gate—available in 600, 900, and 1500 pound classes

piping upkeep costs more now!

You spend less for it by using Dependable Quality

CRANE VALVES

. . . That's why more Crane Valves are used than any other make

NO BONNET JOINT LEAKAGE . . .
NO BONNET JOINT MAINTENANCE

Big maintenance savings can be made on high-pressure/high-temperature piping services by using Crane Pressure-Seal Bonnet valves in place of bolted bonnet valves. Once installed, these valves rarely need maintenance of the bonnet joint—line pressure keeps it leak-tight.

Lighter weight and more compact dimensions make savings in piping erection and suspension. Streamlined body design reduces insulating costs.

Other outstanding and typical features of Crane Pressure-Seal Bonnet Joint design are tailored-to-the-service alloy steels, Stellite trim, deep stuffing box, and flexible wedge disc in larger gates. In gates, globes, angles, or stop-checks, these valves are an investment in better piping performance at lower ultimate cost.

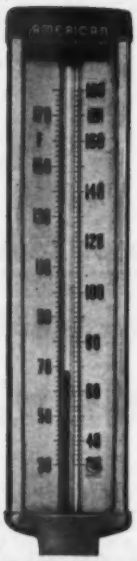
CRANE

CRANE CO., *General Offices:*
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

Temperature Indicating Or Recording Problem?

AMERICAN CAN SOLVE IT!



AMERICAN INDUSTRIAL GLASS THERMOMETERS

Full scale openings of 7", 9", or 12" with easy-to-read red mercury tubing. Straight and angle forms.

Tough or easy! Special or standard! If it's an application for a temperature indicator or recorder, there's an American Thermometer to fit the job.

American Thermometers are available in industrial glass, dial and recording designs. They offer the widest selection in types of actuation and ranges. Beyond this, they provide the user with the highest standards of accuracy as well as readability.

Select from mercury, vapor pressure, gas, bi-metal, or thermocouple actuation; ranges from minus 320° F. to 3000° F. And famous "Magic Pulse" capillary tubing allows you to indicate or record temperatures up to 250 feet away from the temperature source.

Yes, American Thermometers are "typically American" . . . truly the finest you can use.

AMERICAN DIAL THERMOMETERS

Highly accurate with clear, bold figures on exactly graduated dials and with a pointer of contrasting color. Several types of cases for stem, wall, or flush mounting.

AMERICAN RECORDING THERMOMETERS

With single, double, or triple pens in round or rectangular cases. 10 inch chart with effective scale width of 3⅝ inches—ample for easy and accurate reading.

Stocked And Sold By Leading Distributors

AMERICAN *Industrial Instruments*

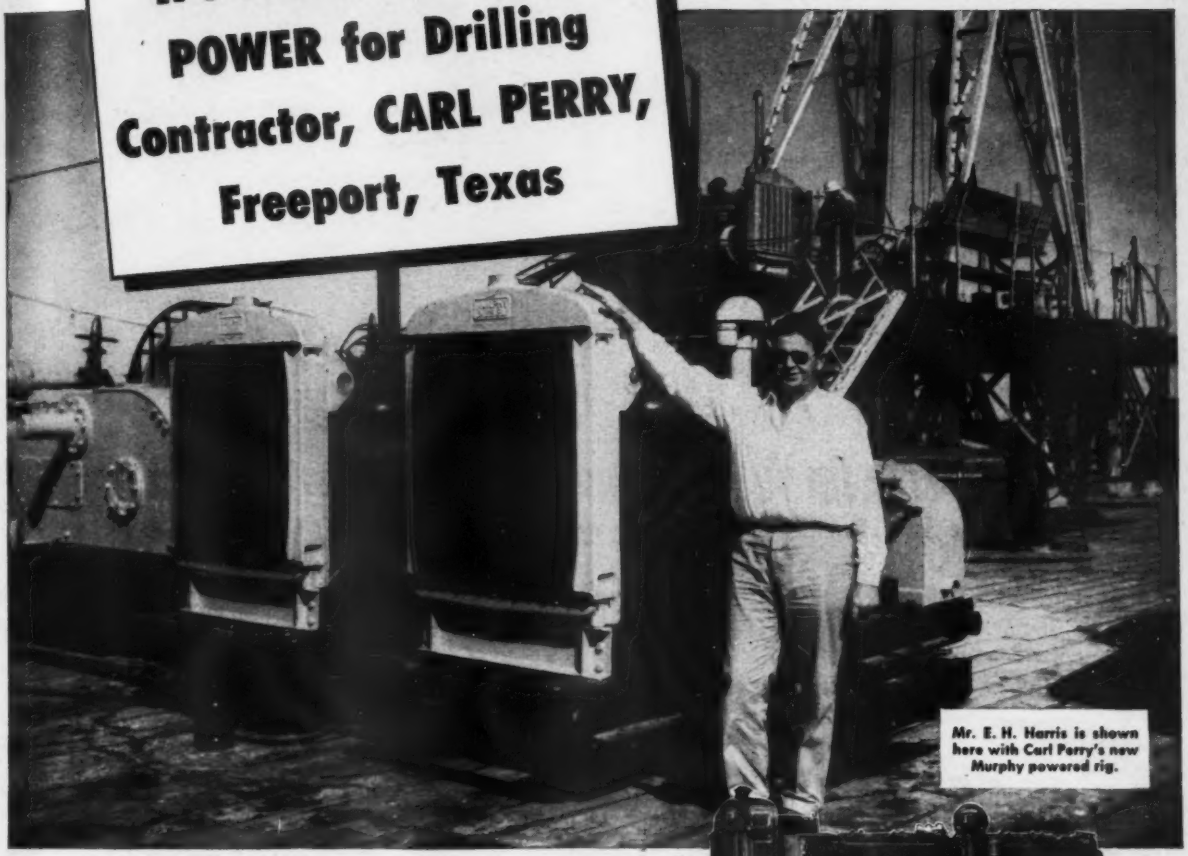
A Product of

MANNING, MAXWELL & MOORE, INC.

STRATFORD, CONNECTICUT

Makers of 'American' Industrial and 'Microsen' Electrical Instruments, 'Hancock' Valves, 'Ashcroft' Gauges, 'Consolidated' Safety and Relief Valves. Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties.

It's MURPHY DIESEL POWER for Drilling Contractor, CARL PERRY, Freeport, Texas



Mr. E. H. Harris is shown here with Carl Perry's new Murphy powered rig.

LIKE Carl Perry, an ever increasing number of drilling contractors are finding that the performance and dependability of Murphy Diesels can be mighty important factors in making hole. And the unmatched fuel economy and long life of Murphy Diesels are mighty important factors in the profit and loss statement.

The combination of performance, dependability, economy and long life results from another combination—Murphy Diesel's proven design features such as "true" diesel operation . . . unit fuel injection . . . four valves per cylinder . . . hydraulic servo-type governor . . . and many others.

The complete story of these features and how you can put their advantages to work for you is told in the booklet *"10 Questions to Ask a Diesel Engine Salesman."* Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL COMPANY
5305 West Burnham St., Milwaukee 14, Wisconsin

OIL INDUSTRY FACTORY BRANCH — *Sales, Parts and Service:*
113-117 South Elwood Street, Tulsa, Oklahoma

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MURPHY DIESEL

Heavy duty power
for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 1200 and 1400 RPM, 90 to 220 H.P. Generator Sets 60 to 133 K.W.

I'd Like to Know . . .

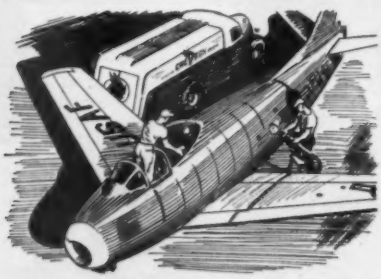
You may have heard that a suit has been filed by the Antitrust Division in Washington to break up Standard of California as well as six other West Coast oil companies. Hundreds of people have already written us protesting this action and many have asked pertinent questions. We believe these questions should be answered for everyone. And we take this way of doing so. If you have a question we urge you to write:

"I'd Like to Know"
225 Bush Street, San Francisco 20

"Would breaking up big oil companies affect national defense?"

Mrs. Marie-Louise Auer, Pasadena housewife, writes: *"It seems to me like a bad time to be tampering with our industries, as the antitrust lawyers want to do. Or does it matter? Would breaking up big oil companies affect national defense?"* Mrs. Marie-Louise Auer

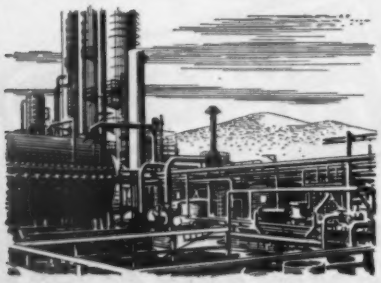
Here at Standard, one of the seven Western oil companies under attack, we see clear public benefit in having big companies in the business at all times. We believe we serve you well. But let's consider now just "bigness" and national defense:



Of course, in time of crisis, military needs get first call. One example: aviation gasolines. In the last six months of 1950, in the West alone, these needs jumped 275%. *Big* oil companies supplied it.

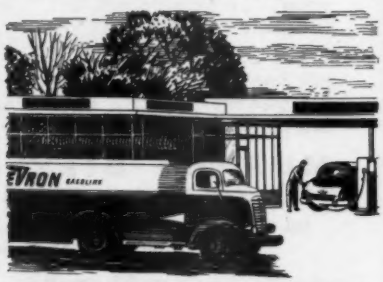
Second obvious demand comes from industry. Has anyone forgotten how much America's strength during World War II depended on industrial production? It takes *big* companies to supply *big* needs.

Another direct result of company *bigness* is product improvement. Big companies do *research* on a *big* scale. Example: the Standard-developed oils which increased U. S. submarines' range 300%.



The national government itself depends on our *bigness* and *integration* to handle hard jobs. Right now, Standard is operating a U. S. atomic research project and a U. S. synthetic rubber plant.

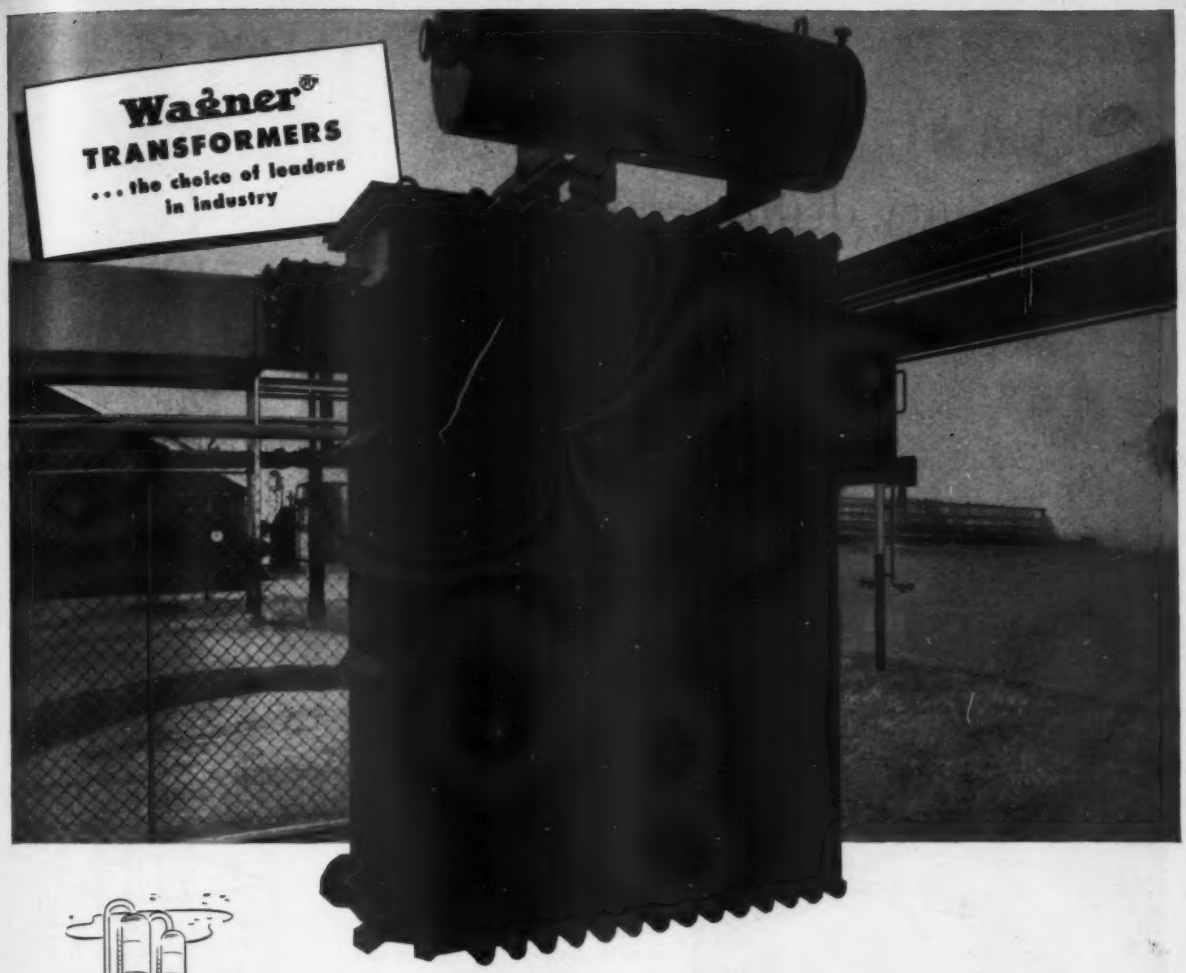
Indirect but important defense contribution is our big tax payments. Last year our taxes were over $95,000,000. As one *big* company, we pay more taxes than we would as several *smaller* companies.

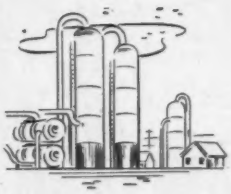


And while all this is going on, Standard's *bigness* and *integration* enable us to keep on producing, refining, transporting and delivering products to you. Isn't this what you *want* from your oil company?

STANDARD OIL COMPANY OF CALIFORNIA

• plans ahead to serve you better





here's dependability at work!

This 2500 kva, 3 phase, 60 cycle Wagner Unit Substation Transformer is located in the high pressure division substation of the modern Ponca City Refinery of Continental Oil Company. It is throat-connected by means of weatherproof bus duct to switchgear located in an adjoining building and feeds all of the electrical load associated with the thermal cracking units and delayed coking units of this refinery. A power interruption of only a few minutes would completely disrupt this important processing and cause a shutdown of the entire refinery.

Wagner transformers are often found, furnishing *dependable* power, in spots where failure would incur great cost because they have a reputation for unfailing dependability—backed by sixty years of transformer building experience.

Bulletin TU-181 tells the complete story of Wagner Power and Substation Transformers. Write for your copy.

Wagner maintains 31 branch offices, located in principal cities, for quick, convenient engineering service and consultation. Call your nearest branch for competent advice on your next transformer installation.

Wagner Electric Corporation
1891 WE 1951

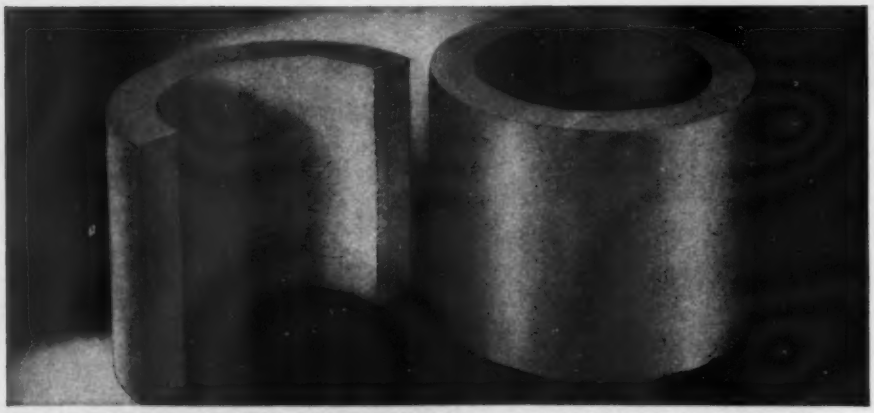
TU-9

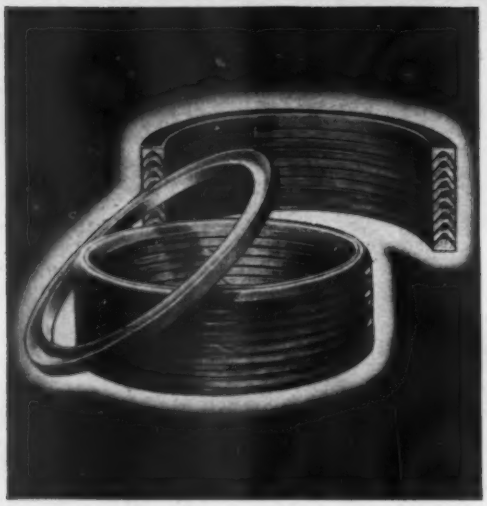
WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

What's U. S. Rubber doing in rotary drilling pumps?





THESE U.S. LINER SLEEVES are made from time-tested compounds, insuring a perfect seal. Available in several types to fill every demand of oil field service.

SELF-ADJUSTING, AUTOMATIC ACTION of U. S. MATCHLESS PACKING reduces wear on rods and plungers, lowers packing costs. Often used at pressures as high as 8,000 psi. Selected as original equipment by many of the largest makers of rotary drilling rigs.

"U. S." oil field specialists are constantly working on new ways, new products to speed up drilling, reduce costs. The line of U. S. Packings, for example, represents in design, materials and workmanship what is *right* from the engineering standpoint. Each type is packaged for easy handling and for quick identification for application. A complete range of sizes and sets are furnished for the leading makes of mud pumps.

U.S. WATER CYLINDER AND POT COVER GASKETS are made from a combination of high quality duck and rubber friction to prevent leaks and blowouts. Lathe cut or cut from slab stock.

PRODUCTS OF U.S. RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

GROVE

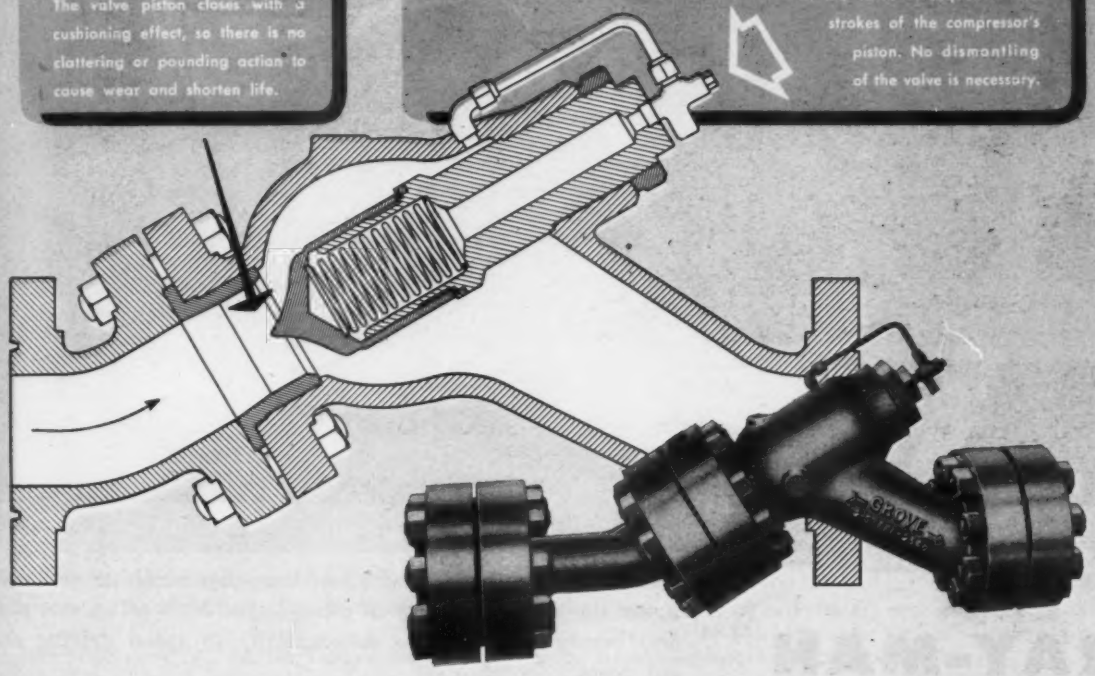
FULLSTREAM COMPRESSOR CHECK VALVE

SLOW CLOSING WITH NO POUNDING

The valve piston closes with a cushioning effect, so there is no clattering or pounding action to cause wear and shorten life.

ORIFICE ADJUSTABLE FROM OUTSIDE

Simply twist the Allen-head screw from the outside to obtain maximum operating efficiency. It's easy to adjust the orifice to counteract clattering of the valve in sequence with strokes of the compressor's piston. No dismantling of the valve is necessary.



IT'S BUILT FOR LONG LIFE IN SEVERE PULSATION SERVICE

The Grove Fullstream Compressor Check Valve has been proved superior by six years of actual field service. The Fullstream design, with only 30° change from line of flow, reduces turbulence and consequent pressure drop. The force required to overcome the weight of the piston and the compression of the spring is approximately one pound per square inch of area. The pressure drop in the 2-inch Fullstream Compressor Check Valve is so low that it is equal to less than 7 feet of pipe. The controlled flow through the adjustable orifice allows the valve to close slowly with a cushioning effect, overcoming the damaging shock of pulsation. Write or wire today for a Grove engineer to tell you the complete story of this important Compresser Check Valve.

The Outstanding GROVE FULLSTREAM Compressor Valve

Orifice easily adjustable from the outside.

Low pressure drop — equivalent to 7 feet of pipe in the 2" size.

The 2" size has less pressure drop than conventional 3" size.

Cushioning effect counteracts pounding, slamming, and clatttering.

Precision manufacture assures long life and maximum efficiency in operation.

Simplified field maintenance.

GROVE REGULATOR CO.

1901 CALUMET ST., HOUSTON, TEXAS
6529 HOLLIS ST., OAKLAND, CALIF.
1930 W. OLYMPIC BLVD., LOS ANGELES, CALIF.

RAY-MAN 635-D BRAKE BLOCKS

(Key-Lok or Bolt-on)

Here's a brake block that gives long, *dependable* service even under the heaviest strings of pipe . . . yet feeds off so smoothly and evenly that it helps substantially to speed drilling and cut costs.

Reinforced with brass wire inserts at the back, each Ray-Man 635-D Brake Block is woven of unusually large asbestos yarns. Fully impregnated with a specially developed saturant.

Ray-Man 635-D Blocks resist bleeding at high temperatures. Won't glaze drums. Won't carbonize even when heavily overloaded!

Key-Lok attachment, too! Key-Lok, the R/M development that

makes it possible to *slide* blocks on and off, is optional with Ray-Man 635-D Blocks. This feature saves relining time . . . eliminates bolt holes, providing greater friction surface and longer wear. No danger of scoring drums with bolt heads. Also available drilled and countersunk for bolt attachment.

RAYBESTOS-MANHATTAN, INC.

WAREHOUSE STOCK: 2809 Taylor Street, Dallas, Tex.

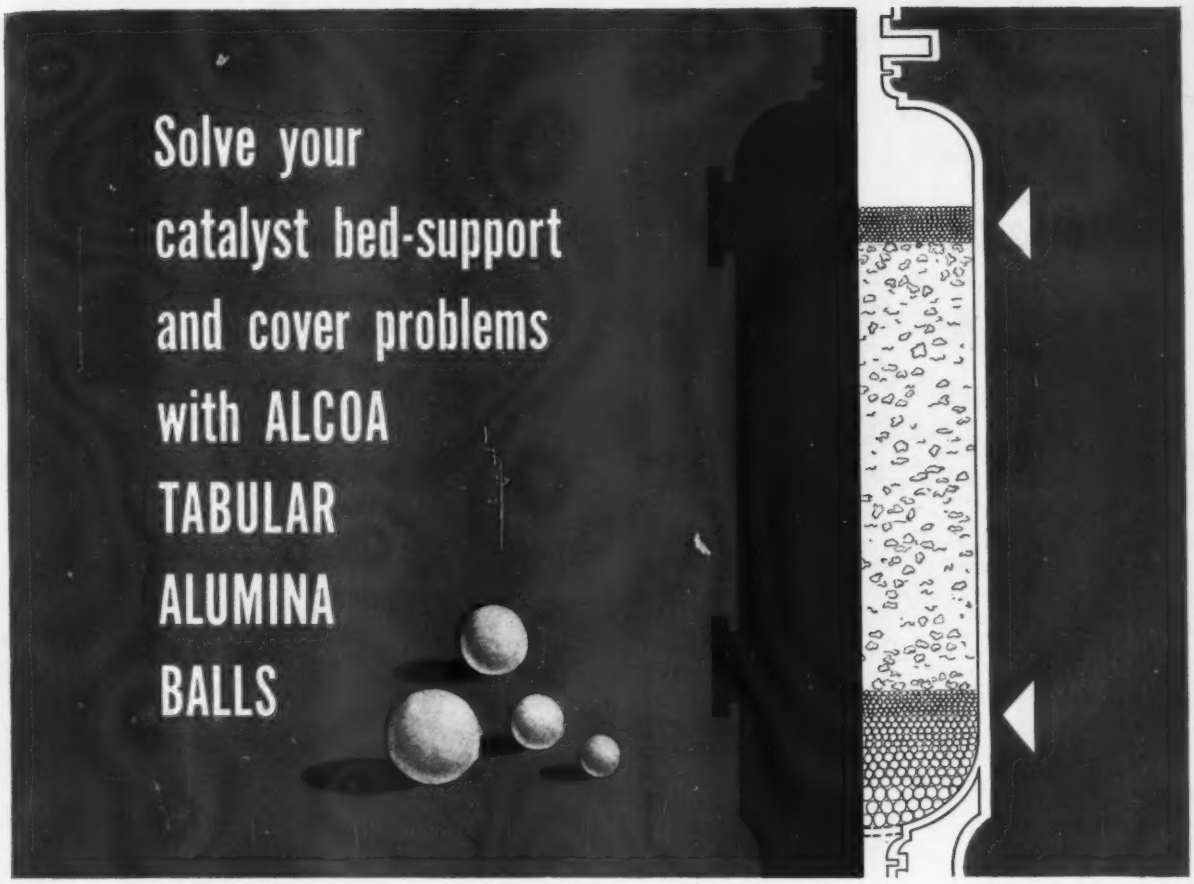
OFFICES:

445 Lake Shore Drive, Chicago 11, Ill. • 4651 Pacific Blvd., Los Angeles 11, Calif.

Factories: Bridgeport, Conn. • Manheim, Pa. • Passaic, N.J. • No. Charleston, S.C.

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings • Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

RM



These hard ceramic balls may make a lot of difference in the operation of your reactor towers. They provide:

Higher Efficiency . . . Better Operation . . .

—The stream is evenly diffused across the catalyst bed . . . Resistance to stream flow is reduced.

—Ceramic balls replace fine mesh inside screens.

—The cover prevents "dancing" of the catalyst when flow is upward . . . Diffuses the stream when flow is downward . . . Holds catalyst in place, should surges occur.

—High purity (99+% Al_2O_3) . . . High resistance to acids and alkalis . . . Chemically and catalytically inert to most products.

Economy . . .

—Simplifies supporting grid.

—High resistance to abrasion, mechanical shock and thermal shock . . . Can withstand sudden temperature changes of more than 1000° C. (1832° F.).

Adaptability . . .

—Any depth of bed-support and cover can be used . . . Five sizes of balls—from ¼" to ¾"—permit a selection best suited to your process.

In addition to their uses as bed-supports and covers, ALCOA Tabular Alumina Balls also offer you money-saving advantages when used as a heat-exchange medium. They have both high heat capacity and high heat conductivity.

Specific heat (at 1000°C.)=0.3 cal./g./°C.
k (at 800°C.)=
0.009 to 0.010 cal./sec./sq. cm./cm./°C.

ALCOA Tabular Alumina Balls may help solve a difficult problem. Let us tell you more about this unique form of alumina. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 618C Gulf Building, Pittsburgh 19, Pennsylvania.

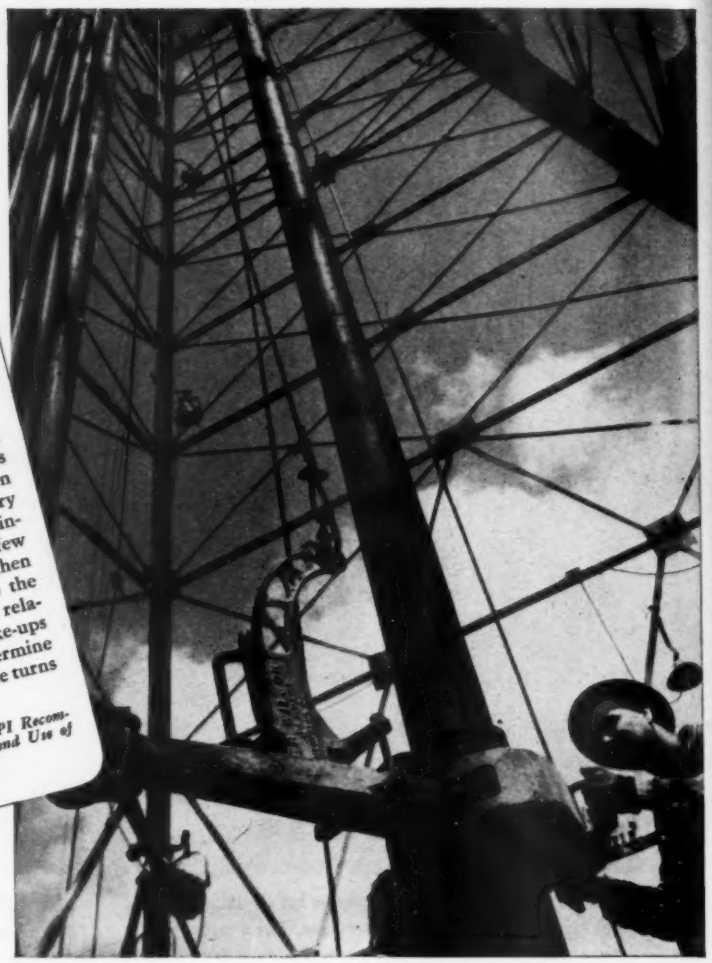
Alcoa Chemicals

ALCOA ®

ALUMINAS and FLUORIDES

ACTIVATED ALUMINAS • CALCINED ALUMINAS • HYDRATED ALUMINAS • TABULAR ALUMINAS • LOW SODA ALUMINAS
ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE • GALLIUM

How to test tong-up tightness



Reminders of Good Casing Practice

When tonging casing, the joint should be made up at least three turns beyond the handtight position. When using a spinning line, it is necessary to compare handtightness with spin-up tightness. Make up the first few joints to the handtight position, then back off and spin up joints to the spin-up tight position. Compare relative position of these two make-ups and use this information to determine when the joint is made up three turns beyond handtight.

Reprinted by permission from "API Recommended Practice RP 5C1: Care and Use of Casing, Drill Pipe and Tubing."

TONG UP TIGHT JOINTS

with Republic Electric Weld Casing

The more uniform the casing wall thickness, the higher the joint strength and fewer the pull-outs.

In Republic Electric Weld Casing, wall thickness and roundness always are uniform. Made of close-tolerance, flat-rolled steel, it is cold formed to tubular shape and joined with a weld that's as strong as the wall. Thus, when those clean, accurate threads are cut, a uniform depth of tough steel remains beneath the root line all around the pipe. No pull-out-inviting thin spots occur.

What's more, it is made from high ductility steel, fully normalized for uniform structure and cold sized to further increase its high yield strength. It offers strong resistance to external pressures . . . helps avoid the dangers of collapse.

You can hold the line against pull-outs and collapse by specifying that your strings be run with Republic Electric Weld Casing and Tubing.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic Electric Weld Casing and Tubing are made from flat-rolled steel, both sides of which are inspected. Thus, the surface which becomes the inside wall is free from hidden defects.

REPUBLIC *Electric Weld* **NORMALIZED CASING AND TUBING**

REPUBLIC STEEL

Other Republic Products include Line Pipe—Carbon, Alloy and Stainless Steels—Upson Studs, Bolts and Nuts—Electrunite Heat Exchanger Tubes

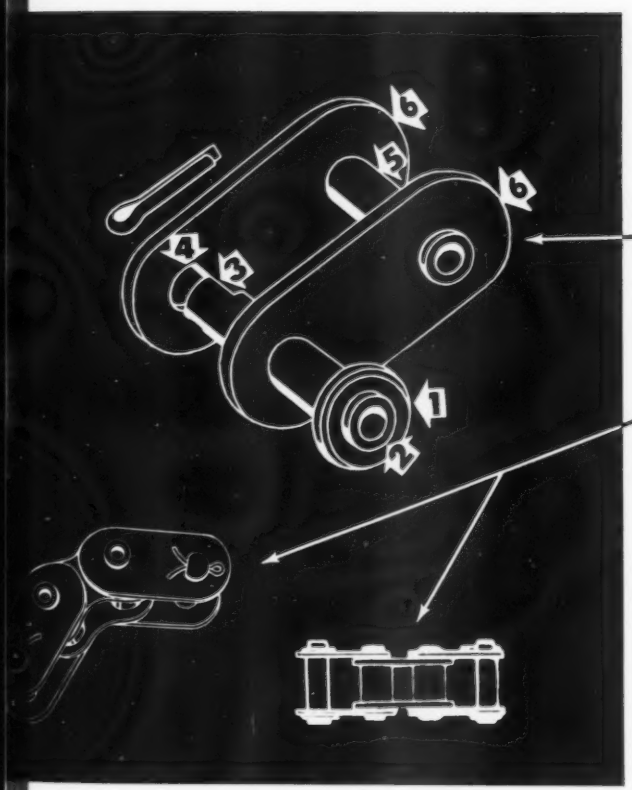
XUM

XUM

BALDWIN-REX "BA" ASSEMBLY MEANS . . .

EASY REPAIR . . .

EASY ADJUSTMENT



Baldwin-Rex "BA" Assembly Riveted Oil Field Roller Chains make possible the quickest, easiest field chain adjustments and repairs you've ever known.

The secret of the Baldwin-Rex "BA" Assembly is the Single Pin Connector Link. A washer (1) is spun over the head of the connector pin (2). The milled flat (3) at the cottered end of the pin fits into a special hole in the side plate (4). This combination holds the pin firmly in place, yet it's easy to remove because it's a "sliding fit" through the entire link except for the milled flat end. When the pin is removed, the riveted pin at the other end of the link (5) holds the side plates (6) firmly in place.

Here's your insurance against excessive loss of drilling time—"BA" 3-Pitch repair units. You can stock them in the doghouse—have them ready for instant use when you need them.

This unit consists of a standard roller link and two single pin connector links. If a link becomes damaged while in service, it can quickly be replaced right on the job by inserting one or more repair units. What's more, these "BA" repair units are interchangeable with any standard roller chain.

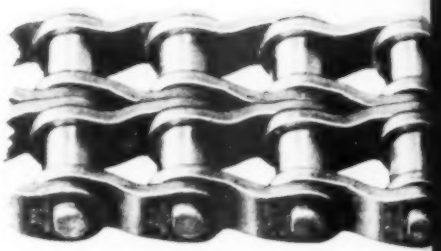
Remember, with the "BA" Assembly you get the longer life and greater strength of riveted chain with the greatest ease of assembly and disassembly yet devised, and in single strand, at even lower cost than with old style detachable chain.

Our Bulletin 49-29 has all the facts on "BA" Assembly as well as Rex A.P.I. Chains and Rex Oil Field Chains. Write for it today or ask for it at your local supply store. Chain Belt Company 1619 W. Bruce Street, Milwaukee 4, Wis.

BALDWIN·REX
ROLLER CHAINS

FOR DRAW WORKS DRIVES

...REX 3125 CHAIN



REX 3125 CHAIN is especially designed for high speeds and high strength required of draw works chain drives. With its relatively short pitch—3⅛"—Rex 3125 Chain can operate at far higher speed than longer pitch chain, yet it has far greater load-handling capacity and shock resistant qualities than any other draw works chain.

These chains have unusually high ultimate strength —115,000 lbs. in single strand and 230,000 in double strand. They are built of highest quality alloy steels with all pins, bushings, rollers and side bars accurately heat treated in the most modern furnaces to develop maximum strength and resistance to wear.

Don't gamble with your draw works drives. Be sure to specify Rex 3125. Your Rex Field Sales Engineer or your local supply store will be glad to show you how Rex 3125 will give you lower costs per foot of hole drilled.

CHAIN BELT REX COMPANY

NOW! A REAL

OIL FIELD UTILITY PUMP

The Rex self-priming utility pump is thoroughly field-tested and field-proved. 5 *outstanding features* make it the pump you can't afford to be without.

- *Simplest Pump Yet Designed.*
- *All Wearing and Moving Parts Accessible* with removal of one cover plate.
- Highly Portable . . . light weight yet sturdy construction.
- *Simplest, Most Positive, Leakproof Seal* ever designed.
- *The Only Pump which Maintains "New Pump" Efficiency its Entire Life.* The *exclusive,* patented Rex Adjustable Air Peeler does the trick.

Rex Oil Field Sales Offices Are Located in the Following Cities:
NEW YORK • TULSA • DALLAS • HOUSTON • MIDLAND • LOS ANGELES

CHAIN BELT COMPANY

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Mass.

REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wis.

REX CONSTRUCTION MACHINERY DIVISION
Milwaukee 4, Wis.

XUM

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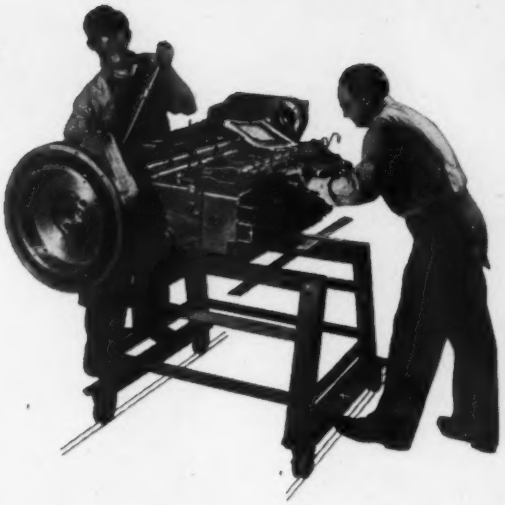
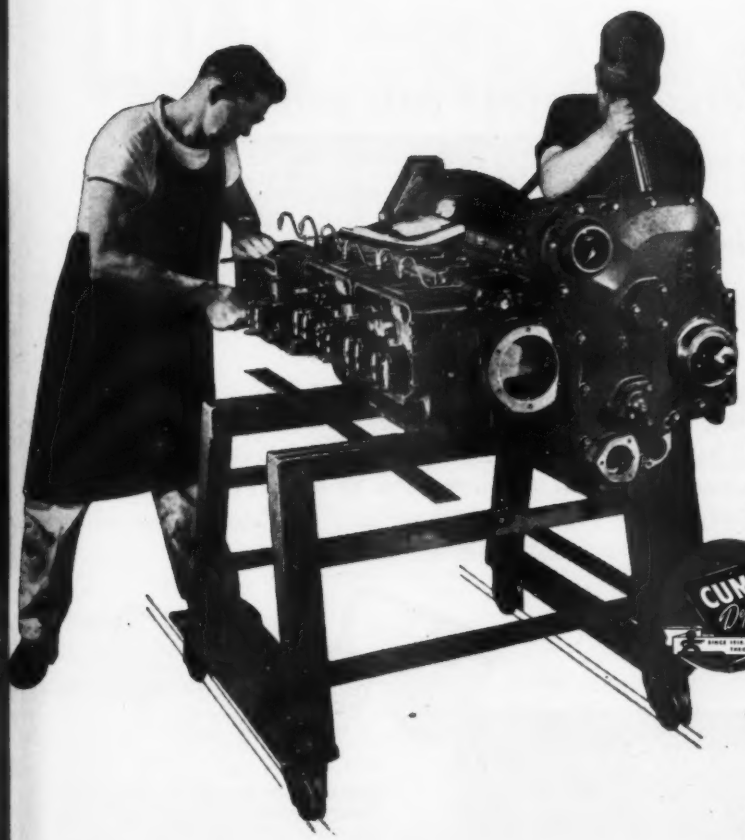
Cummins® Custom-built Diesels

Built not once but Twice



Extra care in building means extra profits for power users



Typical of the extra care that goes into the building of *every* rugged, dependable Diesel is the tear-down of the engine after assembly. First the engine is run in on the test block. Then it is completely torn down and carefully re-inspected. After that it is re-assembled and tested *again*.

Such *extra* care in precision craftsmanship is one of the reasons why Cummins engines have such an outstanding record in a wide range of applications. Cummins exclusive fuel system . . . world-wide service and parts supply organization . . . are other features that enable power users to make more profit with Cummins Diesels.

There's a model engineered to fit your power needs. Contact your Cummins dealer. He has more facts to show you.

CUMMINS Dependable DIESEL

Diesel power by CUMMINS

TRADEMARK REG. U. S. PAT. OFF.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. • Cable: Cumdiex

Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks • off-highway trucks • buses • tractors • earth-movers • shovels • cranes • industrial locomotives • air compressors logging yarders and loaders • drilling rigs • centrifugal pumps generator sets and power units • work boats and pleasure craft.

XUM

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With Skilled Workers Short can you afford*

this high unnecessary Loss?

Eye Accidents Cost $160,000,000 in Lost Man-Hours**

In the effort to maintain and increase production, some sections have resorted to community-wide pooling of skilled labor and machine tools . . . a praise-worthy move. But DON'T FORGET THE OPPORTUNITY OFFERED TO PREVENT LOSSES AND BOOST PRODUCTION BY PREVENTING INDUSTRIAL EYE ACCIDENTS AND THEIR HIGH COSTS!

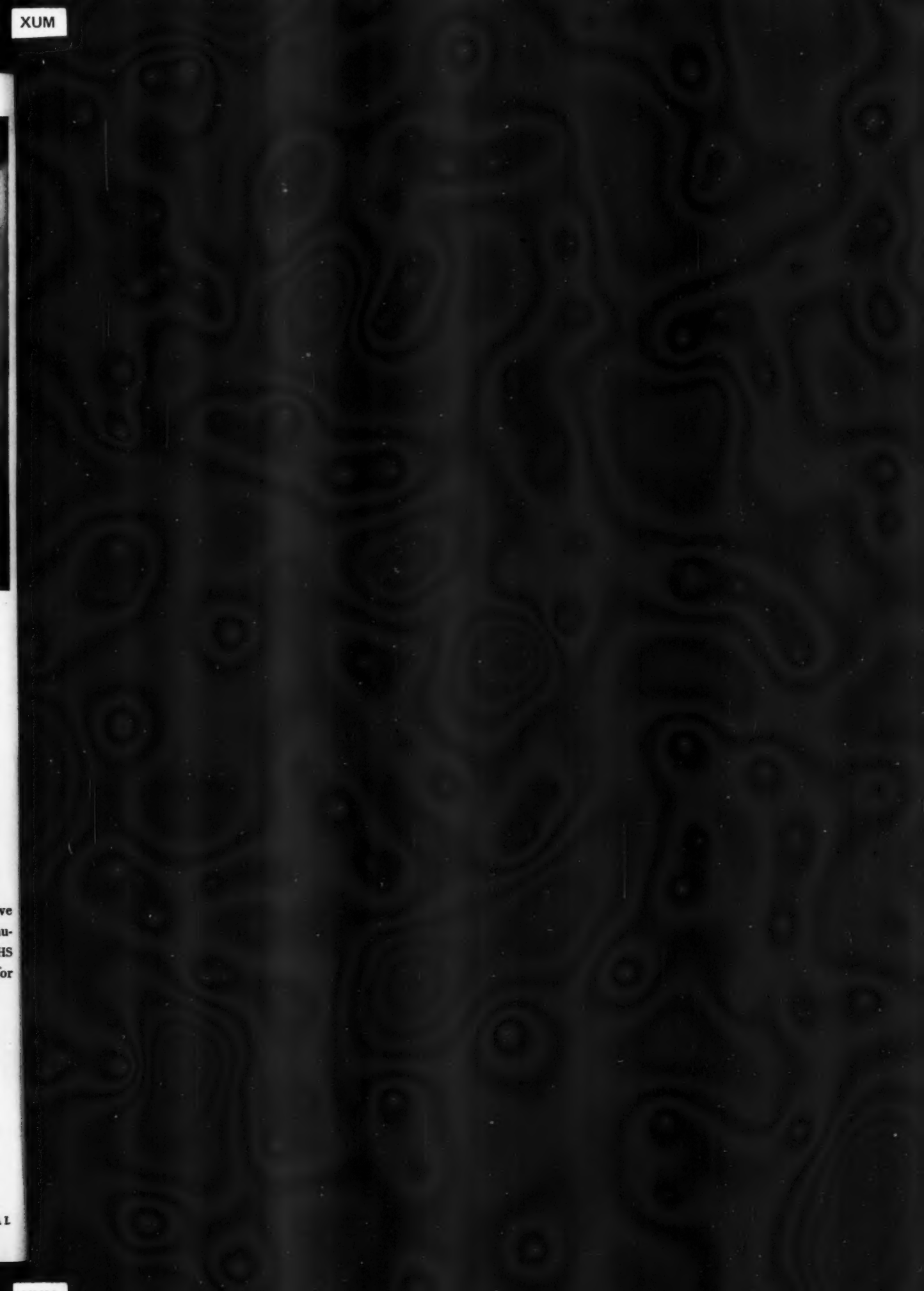
An AO Eye Protection program can prevent 98% of all eye accidents . . . keep valued workers on the job . . . save (as it has for many companies) thousands of dollars annually — AND PAY FOR ITS MODEST COST IN SIX MONTHS TIME OR LESS. Ask your AO Safety Representative for complete facts and figures.

*Bureau of Census reports only 3.7% of the labor force not at work Sept. 1950.

American Optical Company
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

****ESTIMATE.** Does not include average cost of compensation which even for the low cost year of 1938 was $328.



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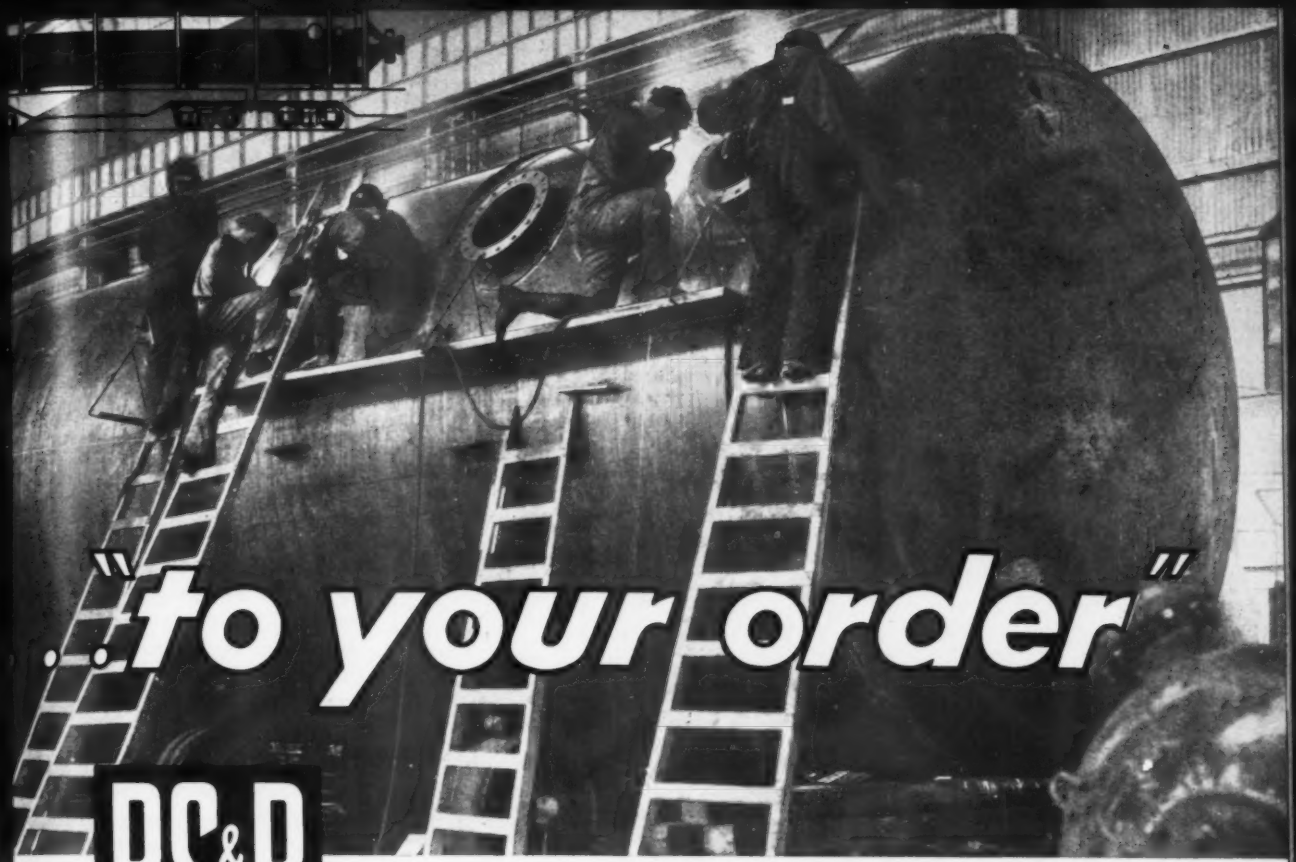
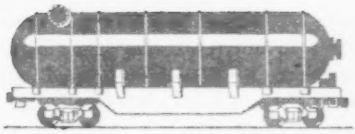


"...to your order"

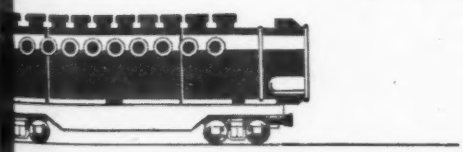
BS&B WELDMENTS



Close-by America's major producing and refining areas are the large, fully-equipped factories of Black, Sivalls & Bryson. For 58 years, BS&B has matched strides with the petroleum industry. Today's plants are capable of turning out special weldments of all shapes and sizes... in standard metals and alloys. Submerged arc automatic welding, modern sand-blasting equipment, X-ray controls, one of the largest gas-fired stress-relieving ovens in Mid-America... these and other facilities are at your command for special fabrication.

What's more, long-experienced BS&B engineers and research men are available for consultation and planning. And the work itself is done by BS&B craftsmen... men who daily surpass highest standards of code construction. Many of industry's advanced techniques were developed by BS&B workmen. Stainless steels, Hastelloy, high tensile carbon and nickel steels and clad materials are all part of everyday routine at BS&B!

Call your BS&B Sales Engineer today for information... or fill in the coupon below. All inquiries guarded in strict confidence.



Black, Sivalls & Bryson, Inc.

KANSAS CITY • TULSA • OLKAHOMA CITY

Cable Address: BLACKSIV, New York

BLACK, SIVALLS & BRYSON, INC., Section 1A-21-3

Sales Promotion Dept., 7502 E. 12th St. Kansas City 3, Mo.

More information, please, about BS&B Weldments and special fabrication. Send literature. ☐ Ask Sales Engineer to call.

Proposed tonnage_____

Length_____ Width_____

Material_____

NAME_____

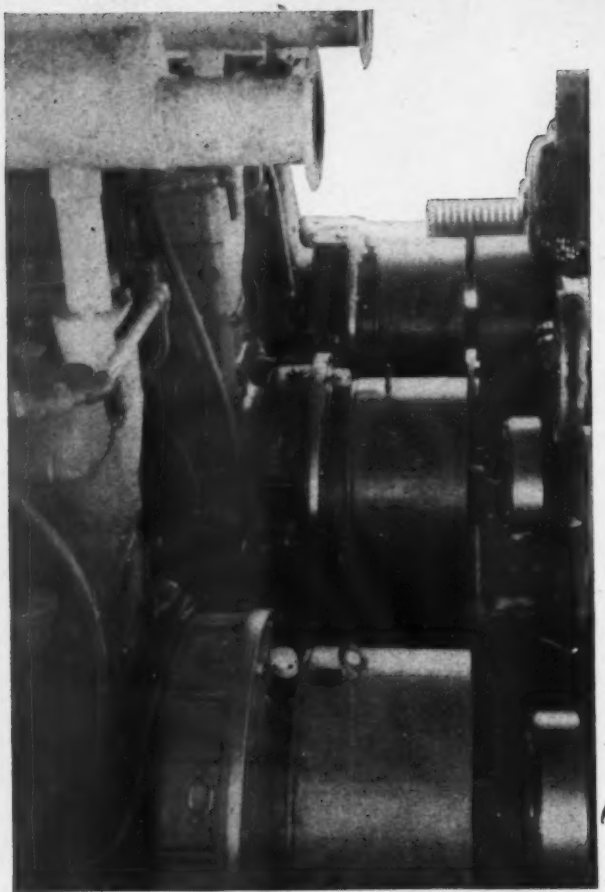
TITLE_____

FIRM_____

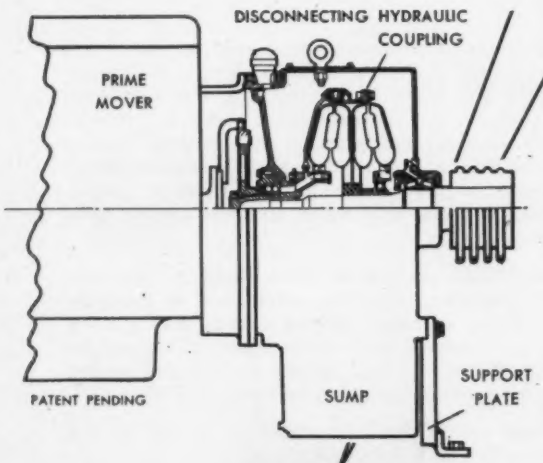
STREET_____

CITY_____ STATE_____

XUM



The new Twin Disc Disconnecting Hydraulic Coupling acts as its own master clutch.



40,000 Feet With No Down-time

Mechanical rigs equipped with the *new* Twin Disc Disconnecting Hydraulic Coupling are *making hole faster*—with far *less maintenance*—than ever before.

Take, for example, the Emsco GA-500 Drawworks, operated by O'Neal Drilling Company in West Texas fields. This rig has been in almost continuous operation since last March, when the HUD Couplings were installed, and, to date, has drilled better than 40,000 feet of hole.

"We have had no chain breaks and practically no chain wear, no clutch, bearing or engine failures since the couplings were installed," reports J. T. O'Neal, Jr.

The Model HUD gives you all the advantages of fluid power in a unit that acts as its *own master clutch.* The hydraulic fluid is "dumped" and held temporarily in a reserve whenever a complete disconnect is desired.

The HUD assures power that "hangs on" because the *engine can't stall.* All "jerks," "jolts," "jumps" are cushioned. The operator can feel his way into a load with the throttle control alone. And, for a complete disconnect, he can actuate a valve to temporarily drain the hydraulic fluid.

For top performance from your mechanical rig, equip it with a Twin Disc Model HUD—the Hydraulic Coupling which acts as its own master clutch. Write for complete information.

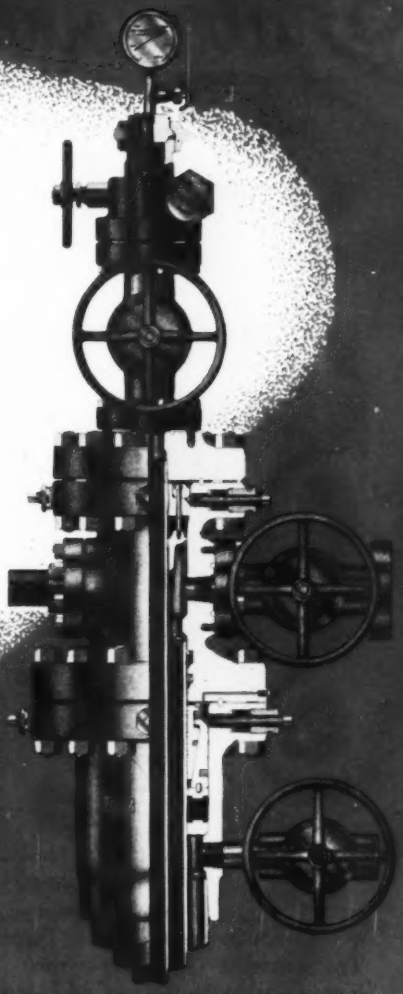
TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

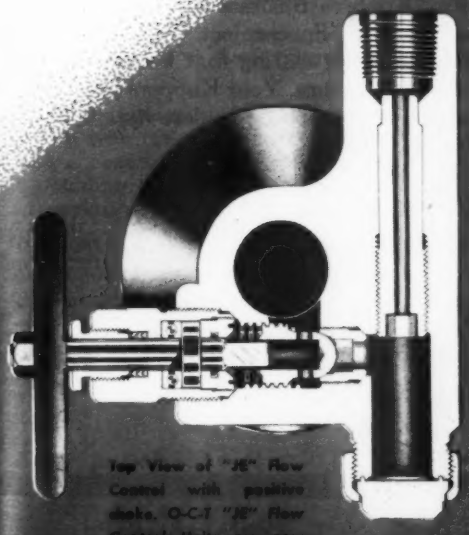
Clutches & Hydraulic Drives

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • SEATTLE • TULSA

SAVE AS MUCH AS $300 ON EVERY TREE WITH THE O-C-T "JE" FLOW CONTROL





Top View of "JE" Flow Control with positive choke. O-C-T "JE" Flow Control Units are now proved in service by more than 3000 installations.

Here's how O-C-T "JE" Flow Controls effect this substantial saving without sacrificing safety or performance. This compact, easy-operating unit . . . adaptable to either positive or adjustable chokes . . . performs the functions and takes the place of a wing valve, Christmas tree cross or tee, adjustable or positive choke and the upper bottom hole pressure connection adapter. In addition, it eliminates the flange connections between the tee and the bottom hole test adapter, between the tee and the wing valve and between the wing valve and the choke. Thus, when used in place of a 10,000 lb. test conventional wing, the O-C-T "JE" Flow Control Unit effects a cost saving ranging as high as 90 per cent. Besides, it reduces weight as much as 70 per cent, provides quick wing valve replacement, greater ease of operation at high pressures and quick, easy field maintenance. Can you afford to overlook the possibilities the O-C-T "JE" Flow Control Unit offers to save with safety? Write for complete details or ask your O-C-T Representative. O-C-T "JE" Flow Controls are available through all recognized supply stores.

Oil Center Tool Co.

P. O. Box 3091, Houston, Texas

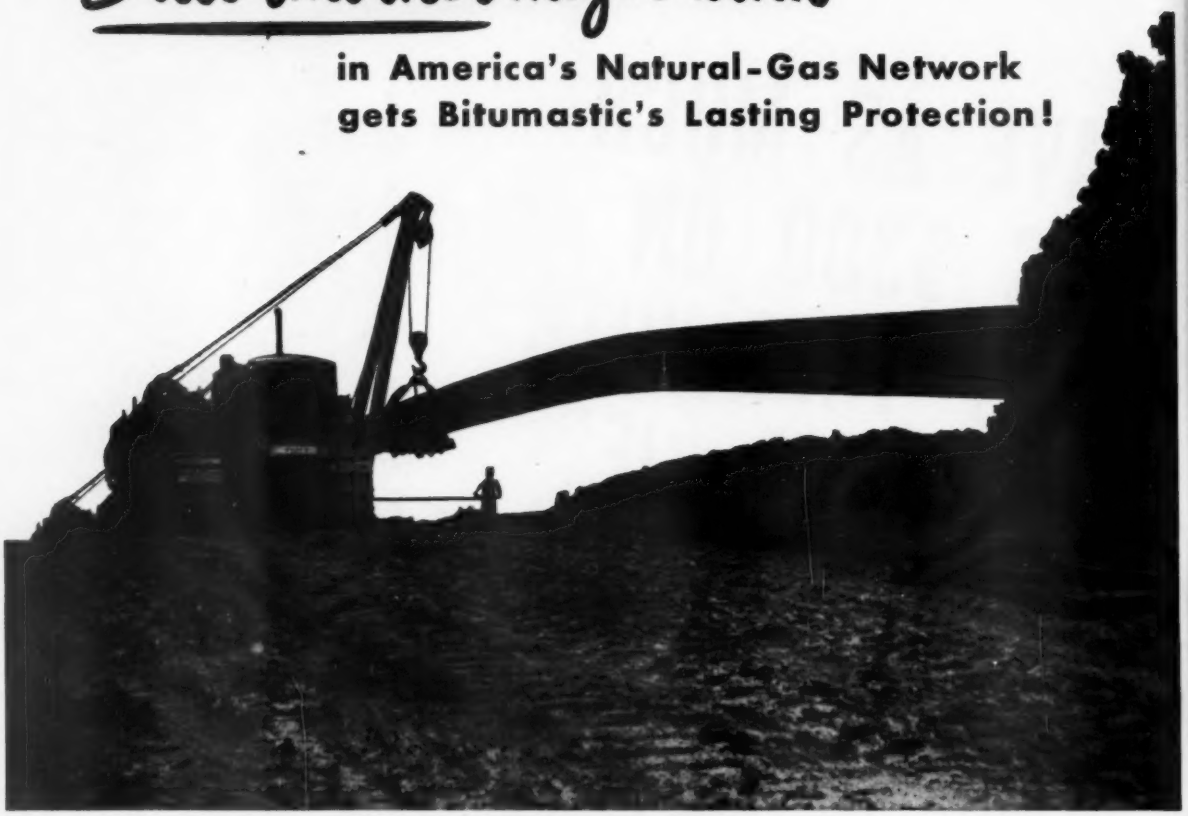
Canada — Canadian-Vickers, Montreal, Canada

Sterling Areas — Le Grand, Sutcliff & Gell, Ltd., Southall, Middlesex, England. Address Export Inquiries for All Other Countries to P. O. Box 3091 Houston 1, Texas.

XUM

Still another major link

in America's Natural-Gas Network gets Bitumastic's Lasting Protection!



Koppers Bitumastic XXH Enamel being machine-applied

● The southern end of the Tennessee Gas Transmission Company's new line from Kentucky to Buffalo is protected against corrosion by Koppers Bitumastic® XXH Enamel. This extension consists of 373 miles of 26" pipe.

Koppers Bitumastic Enamels have established enviable records in combating corrosion. Under the most severe corrosive conditions . . . in all types of soil . . . under wide variations of temperature—pipe lines protected by Koppers Coatings have been giving good service for twenty and thirty years. And the experience gained by Koppers engineers in protecting these lines can be helpful to you.

Specify "Koppers Bitumastic Enamel" for your next pipe-line project. You'll be getting a protective coating that has been proved by performance. Your Koppers representative will give you complete details and estimates.

Why Bitumastic Enamels give lasting protection

Processed from a base of coal-tar pitch, they are impervious to moisture . . . chemically resistant to soil elements. They make a tight bond with the pipe . . . do not disintegrate with age . . . maintain continuously high electrical resistance.

KOPPERS **BITUMASTIC** ENAMELS

REG. U.S. PAT. OFF.

KOPPERS COMPANY, INC., Tar Products Division, Dept. 303T, Pittsburgh 19, Pa.

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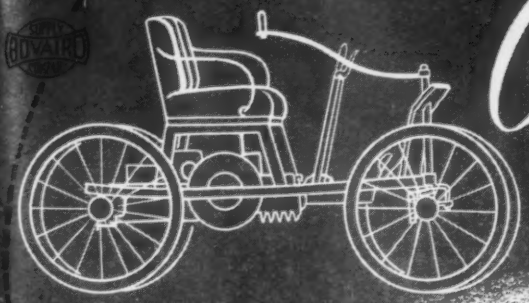


Achievements

THAT HAVE ALWAYS DEPENDED ON PETROLEUM

and Petroleum COULD ALWAYS DEPEND ON

SUPPLY BOVAIRD COMPANY

A generation before the first automobile was built, the oil industry had produced the petroleum products to power and lubricate the motor car.

And the oil industry has, through the years, been both a benefactor and a beneficiary of the automobile industry.

Since its founding in 1871, Bovaird has constantly advanced with the oil business, making studies of the industry's needs, increasing its services and facilities and providing the best equipment. Bovaird's experienced personnel, complete stocks and 22 strategically located offices and stores are ready at any time to give the fast, dependable service you want.

OFFICES AND STORES

ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, Great Bend, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Pauls Valley, Ringwood, Sapulpa, Seminole, Tulsa
TEXAS—Borger, Dallas, Midland, Odessa, Pampa, Snyder

"Buy From Bovaird"

THE Bovaird SUPPLY COMPANY

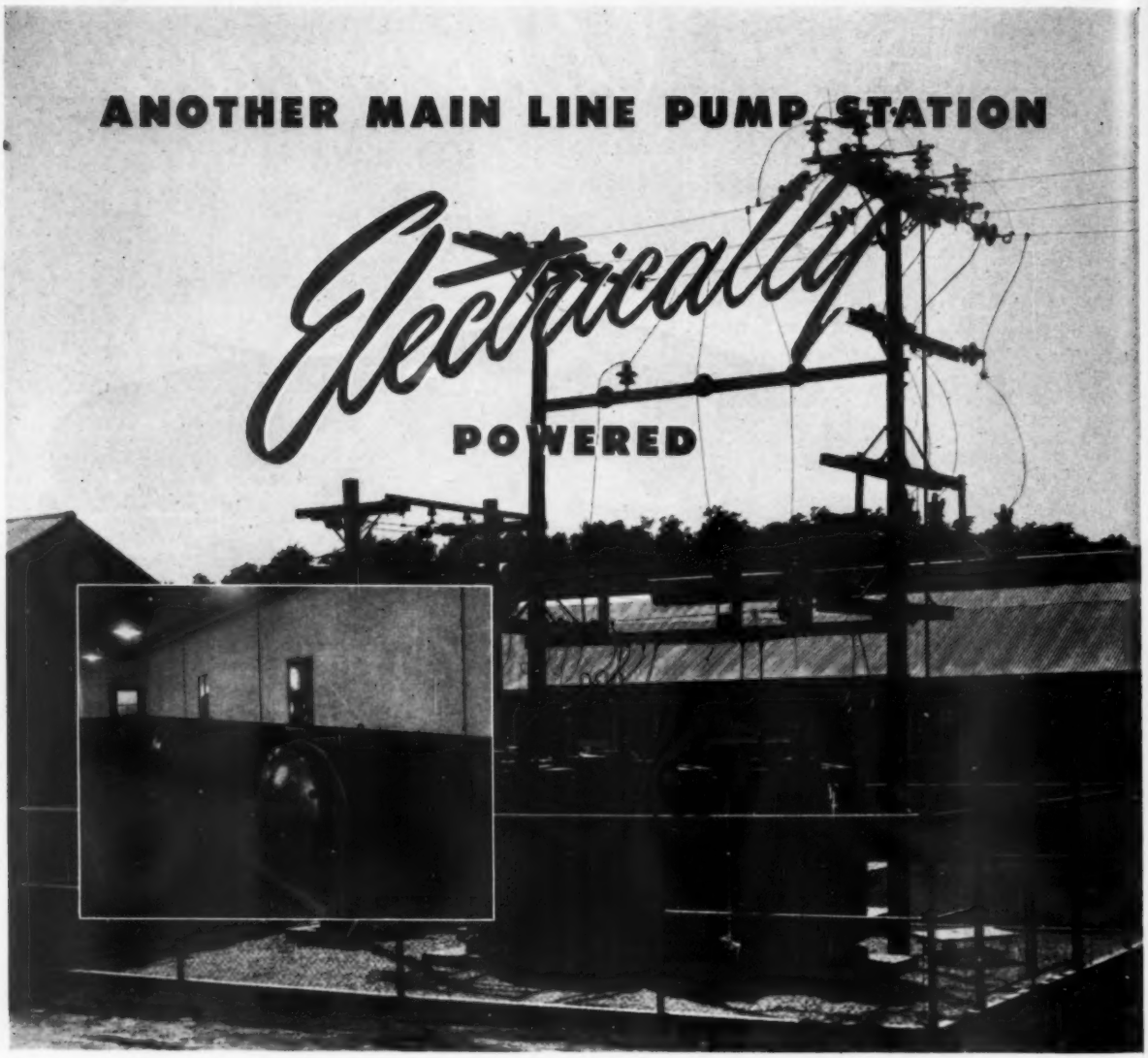
GENERAL OFFICES
TULSA, OKLAHOMA

80 YEARS OF PROGRESS WITH THE OIL INDUSTRY

XUM

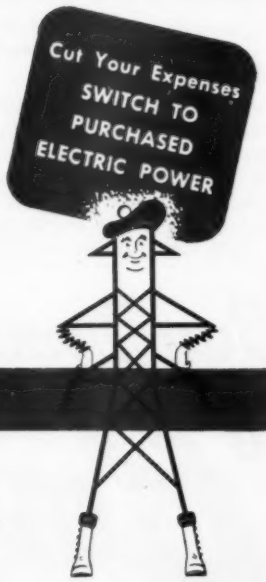
ANOTHER MAIN LINE PUMP STATION

Electrically POWERED



This is another PURCHASED ELECTRIC POWER installation for your files—a main line pump station at Drumright, Oklahoma, powered by two 800 H.P. motors and one 400 H.P. motor. With labor, maintenance and material costs going up and up ELECTRIC POWER—provided by your dependable Electric Power Service Company—is your surest way to HOLD EXPENSES DOWN. *PEP has brought a new economy to the Petroleum Industry—an economy with innumerable new advantages. Why not cut your power bills, too, with Purchased Electric Power?

*PEP — Purchased Electric Power



Petroleum Electric Power Association

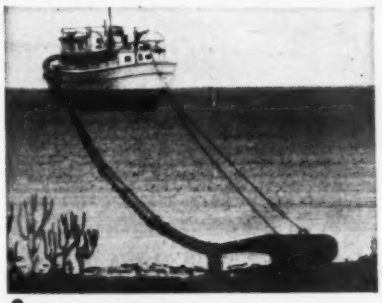
ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

OR ADDRESS YOUR REQUEST TO P. O. BOX 131, DALLAS, TEXAS

Sea-going Vacuum Cleaner

1. **A thousand bushels of oysters** an hour can be picked off the ocean floor as easily as a vacuum cleaner picks dust off a rug. A dredge blade and nozzle travel along the ocean floor, sucking up 2,400 gallons of oysters and water a minute, completely loading a converted Army freighter in only 3 hours.



2. **The sea-going vacuum cleaner** was developed to do a specific job better than it had ever been done before . . . just as new Conoco Super Motor Oil was scientifically developed to protect the engine of your car, better than ever before. Conoco Super gives your car improved performance . . . increased gasoline mileage!

3. **50,000 Miles—No Wear!** After a 50,000-mile road test, *with proper drains and regular care,* engines lubricated with Conoco Super Motor Oil showed *no wear of any consequence* . . . in fact an average of less than 1/1000 inch on cylinders and crankshafts. Gasoline mileage for the last 5,000 miles of the test was actually 99.77% as good as for the first 5,000 miles!

Now in its 76th year, Continental Oil Company is still a leader in oil research and a pioneer in oil-perfecting additives, with more than 100 patents on discoveries that improve performance and lengthen the life of your car.

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They Say—

Integration Not "Big"

"Integration isn't practiced exclusively by 'big business'—it goes on all over the place. A one-man business can be, and often is, integrated... Whether it's a fruit vendor with his own berry patch, a rubber company with its own plantation, a steel company with its own resources of iron and coal, or an oil refinery with its own wells, the basic idea is the same—to eliminate needless overhead and promote efficient, continuous operation.

"If there is anything sinister in the principle of integration, then the integrated fisherman and baker and candlestick maker must be just as wicked as the steel man and the oil man because, in proportion to size of operation, they are just as thoroughgoing integrators as the big corporations. And if Grandma sells her own homemade pies at the bazaar they'll have to count her in—she's integrated, too.

"But the fact is, of course, that there's nothing sinister about any of it. To abolish the freedom to integrate, anywhere in the American scene, would be to circumvent the businessman's freedom to do the best he can for his customer. And when you start imposing handicaps on the right to serve the public as efficiently as possible you're tinkering dangerously with the forward progress of the whole American economy."

—The Bulletin, Standard Oil Co. of California.

Aetna Bearings ....PROVEN PERFORMERS IN RUGGED OIL FIELD WORK

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"A free, dynamic producing industry has proved in the past it is able to accomplish far better results than a government-controlled petroleum industry.

"There are four essential factors to a strong, healthy, aggressive domestic-producing branch of the petroleum industry able to search for and develop needed petroleum reserves and productive capacity.

"These essential factors are: Adequate money... sufficient materials and necessary manpower... including the maintaining of established tax provisions pertaining to percentage depletion and expensing of intangible drilling costs... and the greatest possible freedom from governmental controls consistent with conditions existing under a mobilization program.

"Percentage depletion and the option to expense intangible drilling and development costs have been a major factor in stimulating the exploration for and development to meet the growing need for petroleum products in our growing domestic economy...

"In peace and war our domestic output has increased remarkably. This expanded supply has enabled us to furnish 83 per cent of all petroleum products utilized by ourselves and our allies to win World War II.

"Because of adequate supplies, prices have been low...

"Any reduction in the depletion allowance will diminish the incentive to explore for oil and gas, and the larger the reduction, the less will be the incentive. The less the incentive, the less risk capital will be available, and accordingly there will be fewer discoveries and development of new resources with resultant less productive capacity being developed...

"The lack of immediately available producing capacity would be a serious threat to national security..."

H. B. Fell, executive vice president of the Independent Petroleum Association of America, in a speech before I.P.A.A. district meeting, Colorado City, Tex.

Common-Carrier Status

"Common-carrier status is inconsistent with the functions and obligations of a natural-gas company which operates as a public utility, and any attempt to enforce such a status

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hills or flat

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would conflict with the regulation of natural-gas companies as public utilities.

"A natural-gas public utility is usually under obligation, by statute, franchise, or certificate, or all three, to render service to the general public within certain areas. The public which it serves does not order a specified amount of gas for delivery at a specified time. The consumer uses gas when and in such quantities as he pleases. The amount which the consumer uses is never known until the gas has been delivered. Consumer use fluctuates and in many instances varies widely from day to day. . . . What the natural-gas utility does is to render a natural-gas service to the consumer.

"It does not transport goods from a consignor to a consignee in specific quantities for delivery at a specified place. The natural-gas company must make its service adequate and continuous at all times and all customers similarly situated must be treated on the same basis with respect to service and rates. . . . A natural-gas company cannot await the convenience of the producer for the delivery of gas into its lines, nor can it segregate the gas of different producers. . ."

—Marshall Newcomb, general counsel, Lone Star Gas Co., Dallas.

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CALENDAR

1951

March

Gas Appliance Manufacturers Association, annual meeting, The Homestead, Hot Springs, Va., March 19-21.

Ohio Petroleum Marketers Association, annual convention and marketing exposition, Deshler-Wallick Hotel, Columbus, Ohio, March 20-22.

American Petroleum Institute, division of production, Mid-Continent district spring meeting, Herring Hotel, Amarillo, March 21-23.

North Texas Oil and Gas Association, annual meeting, Kemp Hotel, Wichita Falls, Tex., March 24.

Texas Independent Producers and Royalty Owners Association, fifth annual meeting, Beaumont, Tex., March 27-28.

New England Gas Association, annual meeting, Hotel Statler, Boston, March 29-30.

April

American Gas Association, industrial and commercial gas section, conference on industrial and commercial gas, Shoreham Hotel, Washington, D. C., April 2-4.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, April 2-4.

American Society of Mechanical Engineers, spring meeting, Atlanta, April 2-5.

Oil-Heat Institute of America, annual convention and National Oil-Heat Exposition, Navy Pier and Palmer House, Chicago, April 2-6.

Instrument Society of America, New Jersey section, Essex House, Newark, N. J., April 3.

American Petroleum Institute, division of production, Eastern district meeting, Deshler-Wallick Hotel, Columbus, Ohio, April 3-5.

Pacific Coast Gas Association, annual distribution (technical) meeting, Riverside, Calif., April 4-5.

Midwest Power Conference, fourteenth annual meeting, Sherman Hotel, Chicago, April 4-6.

New York Oil Heating Association, Inc., Hotel Statler, New York, April 9.

Mid-West Regional Gas Sales Conference, Edgewater Beach Hotel, Chicago, April 9-11.

Michigan Petroleum Association, annual spring convention, Detroit Leland Hotel, Detroit, April 10-11.

Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, April 10-12.

American Institute of Electrical Engineers, District 4 meeting, McFadden-Deauville Hotel, Miami, April 11-13.

American Gas Association, distribution, motor vehicle, and corrosion conference, Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

Petroleum Industry Electrical Association and Petroleum Electric Supply Association, twenty-third annual joint conference, Hotel Adolphus, Dallas, April 17-19.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Brussels International Fair, twenty-fifth annual event, Brussels, Belgium, April 21-May 6.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Natural Gasoline Association of America, annual convention, Mayo Hotel, Tulsa, April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27.

Interstate Oil Compact Commission, spring meeting, La Fonda Hotel, Santa Fe, N. M., April 26-28.

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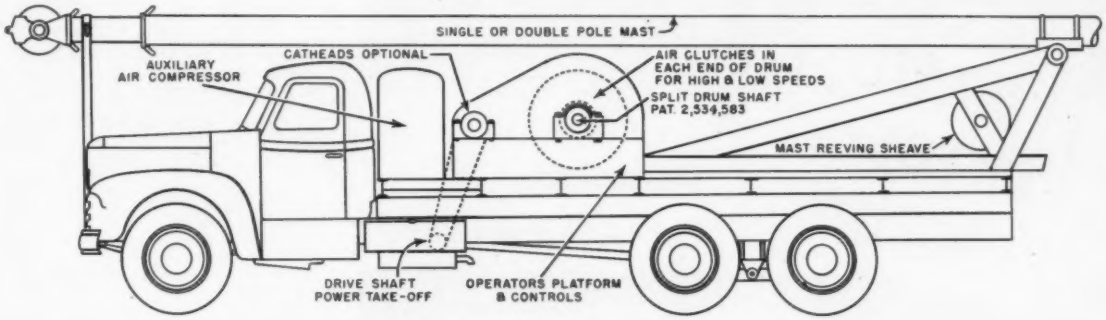
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- 16" Dia. Barrel With Lagging
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- Line Capacity: 7500 ft. ⅝" Dia. 2800 ft. 1" Dia.
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- Catheads

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- 14¾" Dia. Barrel
- 16" Dia. Barrel With Lagging
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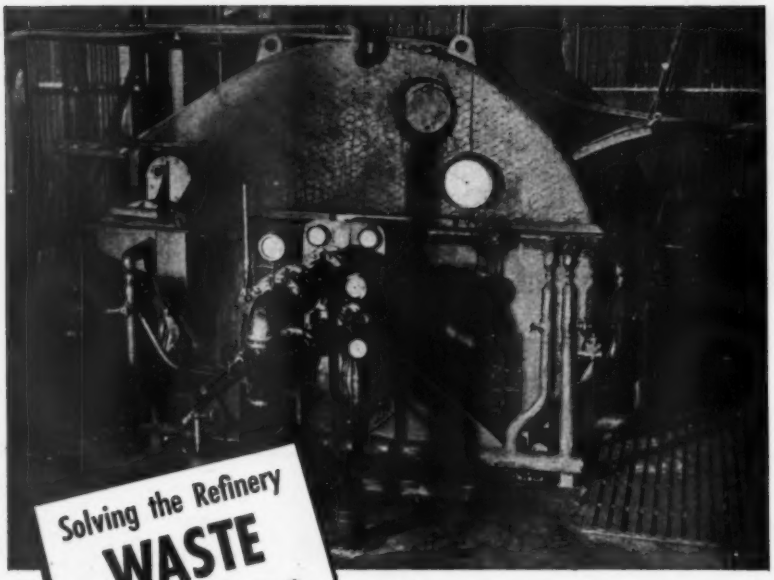

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. . . automatically, economically!

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Trap residues—separator box emulsions—sludges . . . the Oliver Precoat Filter can effectively handle these wastes by dewatering sludges and breaking oil-water emulsions, resulting in stocks for refinery re-run and water ready for disposal in public streams. For example, a refinery is obtaining an oil phase carrying only 2/10 of 1% sludge and only a trace of water; the water phase is comparatively oil-free.

Oliver United engineers, calling on their 42 years of filtration experience and their many varieties of filter types, developed this closed type, continuous vacuum precoat filter for handling refinery wastes. It's proving a boon to refineries in connection with this vexing problem.

A letter or phone call to our nearest office will have a skilled refinery filtration engineer at your plant whenever desired to make a study and recommendations for a filtration plant to handle the wastes properly.

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Another very profitable use of the Oliver Precoat Filter in refineries is in connection with contact clay handling. Many are in service providing continuous handling, great reduction in oil losses over other methods, and more easily handled cake.

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American Gas Association, industrial and commercial gas section, industrial gas school, William Penn Hotel, Pittsburgh, April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3.

Materials Handling Conference, International Amphitheatre, Chicago, April 30-May 4.

May

American Institute of Electrical Engineers, District 1 meeting, Hotel Syracuse, Syracuse N. Y., May 2-4.

New York Oil Heating Association, Inc., Hotel Statler, New York, May 7.

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association, annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles, May 10-11.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

Pacific Coast Gas Association, annual transmission (technical) conference, Bakersfield, Calif., May 16-17.

American Institute of Electrical Engineers, District 5 meeting, Loraine Hotel, Madison, Wis., May 17-19.

Empire State Petroleum Association, Inc., Hotel Statler, Buffalo, N. Y., May 20-22.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

Institution of Gas Engineers, London, England, May 29-June 1.

Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont., May 31-June 1.

June

Society of Automotive Engineers, Inc., summer meeting, French Lick Springs Hotel, French Lick, Ind., June 3-8.

New York Oil Heating Association, Inc., Hotel Statler, New York, June 4.

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Pennsylvania Grade Crude Oil Association, 1951 annual meeting, Hotel William Penn, Pittsburgh, June 14-15.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads, first Monday of each month, Louis Sherry's, 300 Park Ave.

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JOURNALLY Speaking

A-poodle-do

QUITE a few benighted folks around the perimeter of these more-or-less United States still labor under the delusion that Oklahoma is populated almost entirely by blanket Indians and that all the Indians have oil lands.

We Sooners are proud of the fact that there are a lot of the First Americans among us. But most of them dress and act like us more recent arrivals, and few of them own oil wells. However, many of them keep their tribal names and some have land allotments which are valuable for oil. Recently the Indian Office sold a bunch of oil leases on allotted lands of the Apache, Comanche, and Kiowa tribes, and the list of tract owners included such native Oklahomans as Tit-tah, Pe-we-nof-kit, Sah-quodle-quoie, Chah-le-mah, Dizzy-ah-rake-ah, Woof-pe-be-ho, and A-poodle-do.

Just So Story

DOUBTLESS everyone has read Rudyard Kipling's immortal "Just So Stories" about how the elephant got his trunk, how the leopard got his spots, and similar slightly apocryphal explanations of natural phenomena.

We have a story just as amusing and amazing, but entirely true, about how the Journal got its yellow cover. We doubt that any of our readers, even the real, real old timers, can remember 'way back when it wasn't the Big Yellow Book, for our baby has been wearing her yellow dress since she was less than 5 years old.

Back in the high and far-off times, O Dearly Beloved, (to use Kipling's favorite opening line) the Journal had no cover. It appeared on the oil-town newsstands naked but unabashed, looking more like a tabloid newspaper than a magazine. But that didn't bother it. The Journal was young and rough-and-ready in those days, and so was the oil industry of the Southwest, and the two were growing up together.

Then the fabulous Glenn pool came in and put Oklahoma on the oil map, and the little Journal almost split its swaddling clothes trying to keep up with all the oil news. It was growing too big and important to run around in its birthday suit any more, so it went shopping for new raiment. It wanted a garb which would set it apart, attract attention, stand out in a crowd, and give it individuality and character. So it chose yellow.

But why yellow? That, O Dearly Beloved, is the point of the story, and we're not going to tell it to you right now. It's a part of The Journal Story which will be unfolded in full in our Golden Anniversary Number in May. To appreciate the part about the yellow cover you must read the whole story for the proper setting and perspective.

We apologize for starting out to tell a story and then leading you into a promotion blurb, but it's just to whet your appetite for May when the spring flowers will blossom and so will our big birthday book.

Oil Paintings

A COLLECTION of 30 paintings about the oil industry has been donated to the Southwestern Art Association by Standard Oil Co. (N. J.) to be hung in Philbrook Art Center in Tulsa.

If you think the oil business is prosaic and unbeautiful, visit this art gallery and see yourself as artists see you. There's romance, glamor, and even beauty in the business, and if oil men are too busy to notice it, it's good that outsiders are beginning to see other than the mere commercial and technological aspects.

Black Sheep

A NEW synthetic textile now being made from petroleum is said to have all the good qualities of wool plus ability to hold a crease permanently. This is bad news for the pants-pressing and sheep-raising industries. Of course, sheep also produce mutton—or used too—but the price is such that we haven't seen a leg o' lamb for many a moon. If the oil industry can devise a way to make synthetic lamb chops it will do to the sheep what it did to the horse.

—Henry D. Ralph

Marketing Problem Solved!

Here's the solution for all your marketing problems: Turn them over to Anchor! Buying and selling high-quality petroleum products is our business — our only business. Our experienced personnel, extensive transportation facilities and strategically located storage points across the nation, enable us to take expensive marketing off your hands, leaving you free for your specialty.

And, if you need to buy high-quality petroleum products, remember that Anchor carries a complete stock of LPG, DIESEL OIL, FUEL OIL, KEROSENE, NATURAL GASOLINE, NAPHTHA and other petroleum products. Our years of know-how and experience enable us to serve you efficiently and intelligently. We're as near as your phone, so always . . .

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the OIL AND GAS JOURNAL

March 15, 1951

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No wonder it is called "the most VERSATILE* tool in the oil business"

**Webster's Dictionary defines as, "Turning with ease from one thing to another; having an aptitude for new tasks."*

Although we know of literally dozens of different types of jobs that have been performed with the Baker Model "K" Cement Retainer and Casing Bridge Plug (Product No. 400) there are probably an equal, or greater number of "new tasks" which have not come to our knowledge.

It is easy to generalize and list the uses of this truly remarkable device for placing and squeezing cement; placing and squeezing plastics; acidizing; testing; as a bridge plug; and as a fishing tool. But think of the endless variations of these applications, and you will understand why a Baker sales and service engineer had the following to say in an address made to his fellow field workers:

"Certainly I'm enthusiastic about the Baker Cement Retainer—in fact I am *excited* about it! Has any other tool in the oil business successfully solved so many problems? Has any other tool accomplished more? I think not.

"I have seen liners screwed on the bottom of this Retainer, run in the well and cemented. I have seen it set in liners, and the liner run in the well and cemented. I have seen it set between perforations, and cement circulated behind the casing; and I have seen it set in parted strings of casing, the casing picked up, and cemented back in place.

"It has been routine to place plastic in a well with the Baker Model "K" Cement Retainer for the purpose of reducing high gas/oil ratios. Its use has been routine for the purpose of consolidating sands, and plastic has been pumped through it for repairing breaks in casing. But there are many other variations. Not only has a one-zone acid job been done with this tool, it has been used for acidizing two zones. Not only have these zones been acidized, but the well has been brought in through the tool, and a test made. Not only has a test been made through the tool after acidizing, it has been left in the well and used as a production packer! I have helped in its being set above perforations, the well brought in by swabbing or circulating water, a test made; and when the water/oil, or gas/oil ratio was too high, a squeeze job performed through the retainer.

"Has its use been confined to the setting in casing? Not at all; it has been successfully used in open hole.

"In addition to these few applications mentioned, the Baker Model "K" Cement Retainer can be used as a bridge plug! Has any other tool in the oil business successfully solved so many problems? Is any other tool so versatile? I think not. What is its future? What will be the future problems encountered in drilling and producing oil wells; what will be the future problems of secondary recovery; what will be the future problems in remedial work? What new media will be used for cementing, plugging, consolidating and acidizing? I am certain that the solutions to these problems will involve the use of the Baker Model "K" Cement Retainer and Casing Bridge Plug, and improvements and adaptations of it."

ABOVE Construction details of "Cement Retainer" equipped with Junk Pusher.

LEFT Baker Cement Retainer, with Circulation Joint and Control Unit, to provide "versatility".

RIGHT Baker Retainer "Bridge Plug" with Wire Line Pressure Setting Assembly.

The Baker Junk Pusher has slots which permit passage of displaced fluid, but prevent passage of junk or debris which might foul the slips.

NOW RUN AND SET ON AN ELECTRICAL CONDUCTOR CABLE

Since the above address was delivered, and as if to justify this man's predictions of the future, we have developed a method for setting this efficient device as a Casing Bridge Plug when run on an electrical conductor cable. This application is available through several leading service organizations having trucks equipped with all necessary accessory equipment to set the Baker Model "K" Retainer Bridge Plug, Product No. 400-D, accurately at the desired depth, to provide a positive, leak-proof bridge plug which prevents movement of fluid or gas either up or down the well. The "Cast Iron" type Bridge Plug is recommended for permanent installations; the "Magnesium Alloy" type for use as a temporary bridge plug. The former type is designed with easy drillability in mind (even to segmented slips which break up readily); while the "Magnesium" Bridge Plug represents the ultimate in easy drillability.

Complete descriptions, illustrations and specifications are in the Composite Catalog, as well as the separate Baker Catalog gladly sent to any oil man upon request. Inquiries to any Baker Office or representative will receive prompt and courteous attention.

BAKER
OIL TOOLS, INC.
HOUSTON • LOS ANGELES
NEW YORK

Priorities Again

Once again the oil industry is operating under priorities. To obtain material it must fill out forms, keep records, and comply with a bewildering array of numbered and lettered orders and regulations. It is the only industry in the country subject to this sort of red tape.

Standing by itself, this would be a highly distasteful and unwarranted development. But in the light of the national situation it should be welcomed by the industry. Before many months every industry will be faced with a similar procedure. The oil industry has the jump on all other claimants for steel, second only to direct defense production. It is assured of necessary supplies while others must scramble for them.

In the early stages of World War II the oil industry had a very low priority rating. This time there is general agreement in Washington that oil is an essential industry, but even so oil would not have been given this special treatment unless it had asked for it. It asked through the Petroleum Administration for Defense, and PAD presented the case forcefully and well, augmented with a ready-made, detailed, and workable plan.

The National Production Authority, which administers or delegates priorities powers, hesitated a long time before letting this PAD plan go into effect. It was argued that it would be inequitable to make a definite allotment of steel to just one industry while the Government was still unprepared to promulgate similar plans for other essential users.

The industry may never know how hard its representatives in PAD had to work to get approval of NPA Order M-46. Oil got its order because PAD was on the job; it realized that "it's later than you think"; it knew what was needed and how to get it.

At present M-46 provides direct allocations only for oil-country tubular goods—drill pipe, tubing, and casing. With supplies of these big-tonnage items for the producing end of the industry assured, and with the basic procedure established, PAD can later extend the system to other supplies needed by all branches of the oil and gas industry. In the meantime, M-46 provides a positive method of obtaining materials for repair, maintenance, and operation for the entire industry.

Within a few months NPA expects to have a controlled-materials plan (CMP) under which specific allocations of basic materials will be made for all industries, and M-46 will become a part of CMP. But by that time oil's priority plan should be well in the groove.

This priority procedure is a nuisance, but a necessary evil in what amounts to a war economy. It firmly establishes oil as an essential, preferred industry, and provides the steel to drill close to 44,000 wells this year. Thus the industry is well repaid for staffing PAD with men who thoroughly understand the oil business and can successfully fight its battles through the Washington maze.

THIS WEEK

TUBULAR GOODS—NPA issues Order M-46 providing tubular goods for oil and gas production. . . . Order does not specify amount of steel to be made available, but agency says it will provide for drilling at rate of 43,400 wells per year and will require estimated 157,000 tons per month. . . . Priority ratings set up, effective April 1. . . . ¶Frank Watts of PAD tells New York Nomads that production of tubular goods is below what must be supplied if oil needs are to be met. . . .

MATERIALS—All requirements in all branches of oil, natural-gas industries will be covered by controlled-materials plan scheduled to go into operation July 1, PAD says. . . . No further specific orders allocating steel or equipment for industry will be issued by NPA in meantime. . . . ¶NPA issues additional control orders on various materials, sets up oil-field-machinery branch in construction, mining, oil-field-machinery division. . . .

WASHINGTON—Senate committee opens investigation of present, future fuel needs. . . . Oil and coal factions clash during hearings. . . . ¶Interlocking relationships among directors of 1,000 largest United States manufacturing corporations constitute "threat to competition," FTC charges. . . . ¶Warning issued by government officials that industrial use of sulfuric acid will be curtailed due to shortage of raw sulfur. . . .

EXPLORATION—Expansion of drilling activity beyond already record levels imperative if United States is to continue to enlarge its capacity to produce oil, A.P.I. group told. . . . ¶Sun Oil unveils new high-speed electronic reservoir device which predicts future behavior of oil fields. . . . ¶Operations in tidelands area off Texas and Louisiana extended until May 8 by Secretary of Interior Chapman. . . .

INDUSTRY—Four bills directly affecting oil industry approved by Arkansas Legislature, including field-unitization regulations, revised standard gas-measurement law. . . . ¶Oil industry must expand all facilities to keep abreast of current record-demand increases, Ashland Oil head tells group. . . . ¶Buckeye Pipe Line plans common-carrier products line linking seaboard refining centers and Central New York markets. . . . ¶Corrosion, cathodic-protection, use of mobile radios highlight technical-service conference of Pacific Coast Gas Association. . . .

ACTIVITY—Crude production averaged 5,968,300 bbl. daily for week ended March 10, an increase of 44,425 bbl. daily over previous week and 1,206,000 bbl. daily over same week in 1950. . . . ¶Total completions for the week decreased 24 wells to 667. . . . Wildcat completions at 126 wells were off 59 from previous week. . . . ¶Rotary rigs operating in United States on March 5 totaled 2,097, up 53 from previous week and 135 from same time last year. . . .

TRENDS—Refinery runs for week ended March 3 averaged 1,280,000 bbl. daily more than for same week last year. . . . ¶Runs since the first of the year have averaged 1,040,000 bbl. daily more than for same weeks in 1950.

INTERNATIONAL—Iranian group proposes nationalization of oil industry. . . . New anti-Communist premier named to replace assassinated General Razmara who sharply opposed plan before his death. . . . ¶Middle East is logical source from which to meet future increases in crude-oil demand, Aramco official tells analysts societies group in New York. . . .

NATURAL GAS—Royalty owners in Carthage field, Panola County, Texas, ask Railroad Commission for minimum price for gas. . . . ¶Construction started on two compressor stations for Pacific Gas & Electric's 34-in. Topock, Ariz.-San Francisco Bay area, line. . . . ¶Gas from San Juan basin to start flowing through El Paso Natural's line to Topock, Ariz., before first of May. . . .

Form PAD-17 (2-27-51) — UNITED STATES OF AMERICA, PETROLEUM ADMINISTRATION FOR DEFENSE

DOMESTIC PETROLEUM (Oil & Gas) OPERATOR's QUARTERLY REQUIREMENTS STATEMENT

For _____ Quarter 195__

NEW OIL COUNTRY TUBULAR GOODS (*Casing, Tubing, Drill Pipe*)

PAD File No. (*To be filled in by PAD*)

PAD District No.

TO: Petroleum Administration for Defense, New Interior Building, Washington 25, D.C., Attention: Materials Division, Ref. M-46.

NAME OF APPLICANT

ADDRESS (*Street, City, Zone, State*)

Person to be contacted in case of inquiry

Telephone No.

INSTRUCTIONS

Prepare original and *three (3) copies* and mail to the above address.

In the space provided above the operator will fill in the number of the PAD district in which he requires new oil country tubular goods. When oil country tubular goods are required in more than one PAD district, separate statements, each in quadruplicate, must be prepared for each PAD district and accompanied by a Form PAD-17 summary statement, in quadruplicate, tabulating his total indicated requirements for the quarter. Each operator filing a Quarterly Requirements Statement must report his inventories of unused oil country tubular goods on Form PAD-16 in accordance with instructions contained thereon and in compliance with NPA Order M-46. One copy of the Requirements Statement for each PAD district for which the Petroleum Administration for Defense grants a tonnage authorization will be returned to the operator.

PROGRAMMED REQUIREMENTS DURING _____ 195__

Line No.	Description (*Casing, tubing or drill pipe*) (a)	Size (*inches*) (b)	Wt./Ft. (*lbs.*) (c)	Feet (d)	Tons: N-80 and better (e)	Grade J (f)	Grade H (g)	All other (h)	Total (i)
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15	*Total tons*								

INTENDED USE

Line No.	State (*abbreviate*) (j)	Official Field Name or Wildcat Location (k)	Field location (*describe briefly*) (l)	No. wells (m)	Average depth (*feet*) (n)	Surface acres/well (o)	Approx. tons/well (p)
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							

Please sign certification on reverse side

***PROPER FORM.**—This is Form PAD-17 which henceforth must be used by all operators to obtain tubular goods for drilling oil and gas wells. It became effective this week when NPA, after considerable hesitation and delay, issued Order M-46, published in full in this issue.*

Order M-46 Issued

Operators now have priority system for tubular goods; order explains use of PAD Forms 15-16-17, and MRO use

Bertram F. Linz

WASHINGTON.—The long-awaited Order M-46, providing tubular goods for oil and gas production was issued by the National Production Authority March 12, effective immediately.

The order itself does not specify the amount of steel to be made available, but NPA said it will provide for drilling at the rate of 43,400 wells a year and require an estimated 157,000 tons a month.

Special provisions for maintenance, repair, and operating supplies and laboratory equipment are included in the order, necessitated because the recently issued MRO Regulation 4 does not meet the specialized requirements of the oil and gas industry.

Priority ratings.—Effective April 1, operators will be permitted to use the "DO" priority rating DO-48E to obtain casing, tubing, and drill pipe for emergency purposes, and effective July 1 will be permitted to use the rating DO-48 to obtain those products for normal operating equipment.

The order does not apply to foreign operations, but is designed solely to meet the requirements of domestic operators.

The MRO provisions are effective immediately, and oil and gas operators may use the DO-97 rating by writing on an order: "The undersigned certifies that the rating hereby applied is authorized by and is properly used pursuant to the provisions of Order M-46."

Statement required.—Each MRO delivery order of $100 or more, however, must also be accompanied by a statement explaining the specific use to which the material is to be put and the price, quantity, and description of the material. If the total amount is $2,000 or more, or if any single item costs more than $1,000, two copies of the order must be submitted to the PAD materials division and such orders may not be placed until PAD has approved them.

However, where there has been an actual breakdown or suspension of operations and the normal methods outlined above will not get the material by the date and in the quantity required, an operator may write, telegraph, or telephone to PAD in Washington for priorities to secure emergency MRO material.

Quota necessary.—To use the DO-97 rating for MRO material for administrative purposes (office equipment and supplies, etc.) an operator must establish a quota and has a choice of three types, but may not change from one to another without PAD permission.

An operator may adopt a standard quota, one-fourth of the dollar amount he spent during 1950 for MRO material for administrative operations; a seasonal quota, the dollar amount he spent during the corresponding calendar quarter of 1950; or an administrative quota, determined by PAD.

Casing and tubing.—To secure steel casing, tubing, and drill pipe for normal production in cases where sufficient materials are not otherwise obtainable, operators will be permitted to use the DO-48 rating, and in urgent cases the emergency DO-48E rating.

The normal DO-48 rating may be used only to obtain supplies in amounts previously approved by PAD, and in order to obtain approval an operator must file an inventory of unused casing, tubing, and drill pipe on hand on Form PAD-16, and a statement of quarterly requirements of such materials by districts on Form PAD-17, stating when delivery is required.

Upon approval, PAD will return one copy of PAD-17 to the operator together with an authorization stipulating the quantities of casing, tubing, and pipe he may obtain by use of the DO-48 rating.

Deadline near.—Although this priorities assistance will not be available until the beginning of the third quarter on July 1, it will be necessary for NPA to make its allocations in advance of that date, and operators are required to file their PAD-17 reports by March 31 so that provisions may be made for deliveries on and after July 1, and for subsequent quarters the reports will be required at least 3 months prior to the quarter in which delivery is sought.

In the event the quantities approved by PAD are insufficient to meet requirements, operators are given 2 weeks in which to file a supplemental request on PAD-17, with a letter explaining why additional supplies are needed.

To secure use of the DO-48E rating, operators must file applications with PAD on Form PAD-15 either before or during the month in which deliveries are required. If an operator has not filed his inventory report on PAD-16 for the quarter preceding the emergency application, he must submit such a report when applying for the emergency rating.

Must be used promptly.—All ratings authorized by PAD must be used promptly. Operators who receive authorization for steel casing, tubing, or drill pipe on a quarterly basis must place the rated order within 15 days after the beginning of the quarter in which the material is to be delivered. Emergency-rating orders must be placed within 30 days after receipt of the PAD authorization.

If orders are not placed promptly as required or are canceled in whole or in part, operators must notify PAD promptly, and within 48 hours after rated orders are placed and accepted one copy of each delivery order so placed must be transmitted to PAD.

Assistance.—The order provides priorities assistance only for MRO and oil country tubular goods, but recognizes that operators in other branches of the industry may have need of assistance from time to time to obtain other material.

To meet this situation, PAD will give "spot" assistance on individual requests where "an immediate and pressing need" exists. Such requests must include a statement of the reasons why assistance is required, including the following information: The price, quantity, and a detailed description of the material required, the number and date of delivery orders therefor, the supplier or suppliers with whom the orders were placed. The reasons why timely delivery cannot be effected without the assistance requested, the relationship of the materials to operations, and the circumstances which justify assistance in the interests of national defense. Four copies of the statement are required together, where possible, with a copy of the delivery order.

Includes "backlog."—The 1,884,000 tons of tubular goods which NPA estimates will be required under the order (approximately the amount claimed by PAD) includes the 5 per cent set aside which PAD officials said they would seek to take care of emergencies and wildcats. This material is to be made available through 13 supply houses scattered throughout the oil-producing areas, which will enable operators to secure their needs quickly.

The M-46 order does not permit the use of priority ratings for any purpose other than those specifically authorized or in greater amounts or on earlier dates than required for an authorized purpose, and also does not permit the use of ratings for ma-

terial that could be secured without them or for material that could be eliminated by changes in design or by substitution of less scarce material.

Districts reestablished.—The order formally reestablishes the five districts set up by the Petroleum Administration for War. District 1 includes the six New England states, the coastal states to and including Florida, the District of Columbia and West Virginia. District 2 covers Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Oklahoma, Kansas, Nebraska, and North and South Dakota. District 3 is Alabama, Mississippi, Louisiana, Arkansas, Texas, and New Mexico. District 4 is Montana, Wyoming, Colorado, Utah, and Idaho. District 5 covers Arizona, California, Nevada, Oregon, Washington, and Alaska.

Explanation given.—Following issuance of the NPA order the PAD gave an explanation of the use of the three forms previously distributed to the industry, and said that operators who may not have received copies can obtain them from PAD in Washington or from the oil-field-supply companies, state regulatory authorities, or trade associations.

Form PAD-15 is an application for authorization, beginning in April, to use the DO-48E rating to obtain tubular goods needed for emergency purposes, for delivery from field stocks. PAD-16 is an inventory form on which operators are required to report unused oil-country tubular goods on hand as of March 10; the original deadline for return of this form was March 17, but operators who are unable to meet this deadline may report as soon as possible thereafter but before March 31. PAD-17 is an application for authority to use the DO-48 rating in placing orders for oil-country tubular goods to be delivered from United States mills during the third quarter of 1951 for normal operating requirements; it is to be filled out in quadruplicate and return to PAD before March 31.

Lead time.—Deputy administrator Bruce K. Brown pointed out that mill scheduling of oil-country tubular goods requires about 90 days lead time. This means, he said, that purchase orders for the third quarter must be placed early in April. Hence, to give PAD time to balance supply against demand for current operating programs, it is important that operators return PAD-16 and PAD-17 as early in March as possible.

Since drill pipe is in extremely short supply, PAD may in the future request supplementary information from operators, particularly drilling contractors, who will require third-quarter delivery, Brown said.

Field stocks.—Beginning with April, field stocks of tubular goods will be built up at warehouses to be designated by NPA in Los Angeles, Shreveport, and Harvey, La.; Casper, Wyo.; Great Bend, Kans.; Grayville, Ill.; Oklahoma City; Charleston, W. Va.; Mount Pleasant, Mich.; and House, Alice, Odessa, and Wichita Falls, Tex.

These field stocks will be used for filling orders carrying the DO-48E rating, and it is expected that between 6,000 and 7,500 tons of oil-country tubular goods will be made available in this way monthly, representing approximately 5 per cent of total output.

Preferential basis.—In order to encourage additional oil and gas production, casing, tubing, and drill pipe from field stocks will be available on a preferential basis for drilling wildcat oil and gas wells. To the extent that field stocks are not required for drilling or completing wildcats, they will be available to oil and gas operators who do not have tubular goods in stock or otherwise available to meet other emergency needs such as offset or other drilling obligations.

Text of M-46

Title 32—National Defense, Appendix.
Chapter VI—National Production Authority, Department of Commerce.

(NPA Order M-46)

M-46—Priorities assistance for the petroleum and gas industries.

This order is found necessary and appropriate to promote the national defense and is issued pursuant to the authority granted by Section 101 of the Defense Production Act of 1950. Consultation with industry representatives in advance of the issuance of this order has been rendered impracticable due to the fact that it applies to all branches of the petroleum and gas industries.

Purposes and Definitions

Section:

1. What this order does.
2. Definitions.

MRO material—maintenance and repair, operating supplies, and laboratory equipment.

3. The rating.
4. How to use rating for MRO material.
5. Emergency MRO material.
6. Limitation on use of MRO rating.

Material for Use in Production

7. Material covered.
8. The rating.
9. How to use the rating for normal requirements.
10. Time for filing for normal requirements.
11. Filing and rating for emergency requirements.
12. Prompt use of ratings.
13. Other material.

General Provisions

14. Certification.
15. Inventory information.
16. Other regulations.
17. Need for rating or symbol.
18. Additional priorities restrictions.
19. Records, reports, and forms.
10. Communications.
21. Violations.

Authority: Sections 1 to 21 issued under Section 704, Public Law 774, Eighty-first Congress. Interpret or apply Section 101, Public Law 774, Eighty-first Congress; Section 101, Executive Order 10161, September 9, 1950, 15 Federal Register 6105; Section 2, Executive Order 10200, January 3, 1951, 16 Federal Register 61.

Purposes and Definitions

1. **What this order does.** This order sets out the rules by which priorities assistance is made available to petroleum and gas operators to obtain material for maintenance and repair purposes, as operating supplies, or laboratory equipment. It also tells operators how to get assistance in obtaining materials for use in production. The order does not apply to foreign operations.

2. Definitions. (A) "Operator" means any person to the extent he is engaged in the petroleum and gas industries.

(B) "Petroleum" means crude oil and associated hydrocarbons, including the products thereof.

(C) "Gas" means natural gas, manufactured gas, or mixtures thereof.

(D) "Petroleum and gas industries" includes any of the following activities and any operations directly incident to these activities as they pertain to petroleum or gas:

(1) The discovery, development, or depletion of petroleum or gas (production);

(2) The extraction or recovery of natural gasoline or associated hydrocarbons (natural-gasoline recovery);

(3) The movement, loading, or unloading of petroleum (transportation);

(4) The transportation of gas (gas transmission);

(5) The processing, reprocessing, or alteration of petroleum, including but not limited to compounding or blending (refining);

(6) The processing of material for the production of manufactured gas (manufactured-gas production);

(7) The distribution or dispensing of petroleum, gas, or the products thereof, and the storage incident thereto (distribution), and shall include for each of the above listed branches of the industries, to the extent applicable, the control of, or the investigation into more effective methods of conducting, petroleum or gas operations by means of research, technical, or control laboratories.

(E) "Material" means any raw, in process, or manufactured commodity, equipment, component, accessory, part, assembly, or product of any kind.

(F) "Maintenance and repair" means (without regard to accounting practice):

(1) The upkeep of any structure, equipment, or material in a sound working condition or the restoration or fixing of any structure, equipment, or material which has broken down or is worn out, damaged, or destroyed;

(2) Any other use of material not exceeding in material cost $1,000 for any one complete operation which has not been subdivided for the purpose of coming within this definition.

Maintenance and repair does not include: (a) The deepening, redrilling, or plugging back of any well or the initial installation on any well of pumping or other artificial lifting equipment, or (b) any use of material in connection with a service station or retail outlet other than for upkeep or restoration purposes or the replacement of equipment worn out and beyond repair.

(G) "Operating supplies" means any material other than material used for maintenance and repair which is essential to and consumed in the petroleum and gas industries and which is normally carried by an operator as operating supplies or which is normally chargeable to operating expense, including, among other items, chemicals, additives, and blending agents.

(H) "Laboratory equipment" means material or equipment used exclusively for the purpose of controlling, or investigating more effective methods of conducting, petroleum and gas industries operations by means of research, technical, or control laboratories. This material or equipment shall not, however, include material for use in the construction of laboratory buildings or other structures.

(I) "Oil-country tubular goods" means those basic forms of steel produced in the United States as itemized on Schedule A of this order.

(J) "PAD District" means any one of the

five areas designated as a PAD district on Schedule B of this order.

(K) "Delivery order" means any purchase order, contract, release, or shipping instruction which constitutes a definite and complete instruction from a purchaser to a seller calling for delivery of any material or product. The term does not include any contract. Purchase order, or other arrangement which, although specifying the total amount to be delivered, contemplates that further instructions are to be given before delivery is made.

(L) "Administrative operations" means the supervisory, fiscal, administrative, or clerical activities necessary to the operation of plants, units, or facilities involved in and a part of the petroleum and gas industries.

MRO Material-Maintenance and Repair, Operating Supplies and Laboratory Equipment

3. **The rating.** To secure material for maintenance and repair, operating supplies, or laboratory equipment (all known as MRO material) an operator may use and apply the rating DO-97.

4. How to use rating for MRO material.

(A) To use the rating DO-97 for MRO material, other than MRO material to be used for administrative operations, an operator must:

(I) Place the rating on each delivery order for material together with the words set forth in Section 14.

(II) Prior to placing the order with the supplier, if it is for a total amount of $2,000 or more or if any single item costs more than $1,000, submit for approval two copies of the order to the Petroleum Administration for Defense (PAD), Washington 25, D. C., Att.: Materials Division. A delivery order of this kind required to be submitted to PAD for approval may not be placed until there has been returned to the operator one approved copy of the order.

(III) Prior to placing the order with the supplier, if it is for a total amount of $100.00 or more but less than $2,000 and contains no single item which costs more than $1,000, submit for information one copy of the order to the Petroleum Administration for Defense, Washington 25, D. C., Att.: Materials Division. A delivery order of this kind required to be submitted to PAD for information may be placed with the supplier as soon as the information copy is submitted.

(B) To use the rating DO-97 for MRO material to be used for administrative operations an operator must:

(I) Establish a quota in accordance with the provisions of Schedule C.

(II) Place the rating on each delivery order for material together with the words set forth in Section 14 below.

An operator may not use the rating DO-97 for MRO material to be used for administrative operations in excess of a quota applicable to him established pursuant to the provisions of Schedule C.

5. **Emergency MRO Material.**—Where there has been an actual breakdown or suspension of operations and where the methods specified above will not get the material on the date and in the quantity required, an operator may request priorities assistance to secure emergency MRO material by letter, telegram, or telephone to the Washington office of the Petroleum Administration for Defense advising the date of the actual breakdown or suspension of operations and the operations affected, the equipment to be repaired and its function in maintaining continuous operation, the price, quantity, and a detailed description of the material required including the number and the date of delivery orders therefor, and the supplier or suppliers from whom the material is to be obtained.

If information is supplied by telephone, it must be confirmed within 3 days by letter or telegram.

No delivery order for emergency MRO material need be submitted for approval to PAD, but an operator may not place a delivery order bearing the rating DO-97 with the supplier for emergency MRO material until approval to do so has been received and a delivery order has been certified in accordance with Section 14 hereof.

6. **Limitation on use of MRO rating.**—The rating DO-97 authorized herein for MRO material may be used to secure services to the extent provided for in NPA Regulation 2 as amended from time to time. The rating DO-97 authorized herein may not be applied to secure items upon List A of such NPA Regulation 2 as amended from time to time.

Material for Use in Production

7. **Material covered.**—At the present time a rating is assigned by this order to obtain only MRO material (covered in Sections 3 to 6 above) and oil-country tubular goods. Material other than MRO material or oil-country tubular goods will have to be obtained without rating unless special provision is made in accordance with Section 13.

Needs for oil-country tubular goods are divided into two classes: (1) normal requirements, and (2) emergency requirements. Separate rules apply to each. Normal requirements are the quantities of oil-country tubular goods necessary to meet an operator's projected quarterly drilling program, including exploratory wells. Emergency requirements are those quantities of oil-country tubular goods found necessary to carry out exploratory operations, drilling obligations, or the like, in circumstances where sufficient materials are not on hand, readily available, or otherwise obtainable without use of a DO rating. The PAD will review applications for requirements and will authorize, on the basis of information submitted by the operator, quantities of oil-country tubular goods based on the needs of the operator and the availability of material.

8. **The rating.**—To secure oil-country tubular goods for normal requirements an operator may use and apply the rating DO-48; for emergency requirements an operator may use and apply the rating DO-48E. An operator may not use either of these ratings until he has complied with the rules set out below and he has been informed by PAD that a rating may be applied to a quantity of oil-country tubular goods authorized by the Petroleum Administration for Defense.

9. **How to use the rating for normal requirements.**—The ratings DO-48 may be used by an operator only to obtain those quantities of oil-country tubular goods which have been approved by PAD. In order to obtain PAD approval, an operator must:

(A) File with PAD four copies of Form PAD-16 (petroleum and gas operator's inventory of unused oil-country tubular goods) for each PAD district in which operations are being or are to be conducted; and

(B) File with PAD four copies of Form PAD-17 (petroleum and gas operator's quarterly requirements statement) for each PAD district in which operations are to be conducted during the calendar quarter when delivery of the material requested on the form is required.

PAD will return to the operator one copy of Form PAD-17 together with an authorization giving the quantities of oil-country tubular goods which the operator may obtain by use of the rating DO-48. To use the rating to obtain deliveries of these quantities, an operator must place the rating on each delivery order for such material, together with the words set forth in Section 14 below.

The times for filing applications for normal requirements on Form PAD-17 are set forth in the following paragraph. The rules on filing Form PAD-16, covering inventories, are set forth in Section 15 of this order. Operators should remember that PAD will not authorize quantities of material on Form PAD-17 until an operator has reported his inventory on Form PAD-16.

10. **Time for filing for normal requirements.**—It is not possible to bring into effect the assistance program for normal requirements during the second quarter of 1951. Accordingly, normal requirements for oil-country tubular goods cannot be delivered with priorities assistance until the beginning of the third quarter, that is, July 1, 1951. For deliveries of normal requirements before that date, operators will have to look to usual commercial sources without rating assistance.

In order to authorize quantities far enough in advance to permit deliveries on and after July 1 through use of rating DO-48, it will be necessary for operators to file Form PAD-17 at the earliest practicable time. In any event Form PAD-17 must be filed for deliveries for the third quarter (July, August, September) not later than March 31, 1951. Four copies of Form PAD-17 should be filed, addressed to the Petroleum Administration for Defense, Washington 25, D. C., Att.: Materials Division.

For the quarters following (that is for deliveries during the fourth quarter of 1951, the first quarter of 1952, and so on) an operator must file Form PAD-17 at least 3 months prior to the quarter in which delivery of the materials is to be made. Thus for deliveries to be made in October, November, or December of 1951, an operator must file with PAD Form PAD-17 not later than June 30, 1951.

After Form PAD-17 has been returned to an operator, he may find that the quantities authorized are inadequate for his normal requirements during the ensuing calendar quarter. In that event the operator may file a supplemental request for oil-country tubular goods. This filing should be by Form PAD-17 (four copies), accompanied by an explanatory letter in duplicate, both addressed to the Petroleum Administration for Defense, Washington 25, D. C., Att.: Materials Division. The filing should be within 2 weeks of the time that the operator receives his original authorization. In the event that additional quantities are authorized by PAD, the operator will be appropriately notified and may then apply rating DO-48 to his delivery orders for these quantities in the manner specified above (Section 9).

11. **Filing and rating for emergency requirements.**—Use of rating DO-48E to obtain quantities of oil-country tubular goods for emergency requirements will be permitted for deliveries to be made after April 1, 1951. Before the rating may be used for this purpose, an operator must file with PAD four copies of Form PAD-15 (emergency-requirements application). Form PAD-15 may be filed either before or during the month in which deliveries of oil-country tubular goods for emergency purposes are required. When the operator has not filed Form PAD-16 for the quarter preceding the emergency application, he must accompany his Form PAD-15 request with the inventory report called for on Form PAD-16.

PAD will notify the operator of the quantities for which he is authorized to use a DO-48E rating. The operator may not use the rating until he has been authorized to apply it to a specific quantity of oil-country tubular goods, and may use the rating to obtain no more than that quantity unless specially authorized to do so under this or other provisions of this order. The operator may use the rating DO-48E by placing the rating on each delivery order for the materials authorized, together with the words set forth in Section 14 below.

12. **Prompt use of ratings.**—After an operator has been authorized to use a rating on a quantity of oil-country tubular goods, he must do so promptly. An operator who receives authorization for a quantiy of oil-country tubular goods on a quarter basis must place his rated delivery orders for this quantity within 15 days after the beginning of the quarter in which the material is to be delivered. An operator who receives authorization for a quantity of oil-country tubular goods pursuant to either an emergency application or a supplementary application must place his rated delivery orders for the quantity authorized within 30 days after the authorization is received. If orders are not placed within the appropriate period or when an order is canceled in whole or in part, the operator must promptly notify the PAD in Wash-

ington the extent to which rated orders have not been placed or have been canceled.

Within 48 hours after rated orders are placed by an operator and accepted by the supplier for quantities of material authorized on Form PAD-17, one copy of each delivery order so placed shall be sent to the Petroleum Administration for Defense, Washington 25, D. C., Att.: Materials Division.

Materials Other Than MRO or Oil Country Tubular Goods

13. **Other material.**—Priorities assistance is authorized in this order only for MRO material and oil-country tubular goods. Operators in all branches of the petroleum and gas industries may have need of assistance from time to time to obtain other material for their operation. At present, the extent of this assistance will be limited. To request assistance when an operator is not able to obtain material to meet an immediate and pressing need, an operator should prepare a statement of the reasons why assistance is required, containing the following information: The price, quantity, and a detailed description of the material required, the number and date of delivery orders therefor, the supplier or suppliers with whom the delivery orders have been placed, the reasons why timely delivery cannot be effected without the assistance requested, the relationship of the materials to operations, and the circumstances which justify assistance in the interests of national defense. This statement in four copies should be sent to the Petroleum Administration for Defense, Washington 25, D. C. Ref.: M-46. Where possible a copy of the delivery order should accompany the application.

General Provisions

14. **Certification.**—The certificate which an operator must use in applying the preference rating is: "The undersigned certifies that the rating hereby applied is authorized by and is properly used pursuant to the provisions of NPA Order M-46."

15. **Inventory information.**—An operator must file Form PAD-16 prior to receiving authorization of quantities of oil-country tubular goods. The first filing date is March 17, 1951. Inventory information shall be current as of March 10, 1951.

A second inventory report is to be made to PAD prior to July 1, 1951. The information on the form shall be current as of June 20, 1951. A third inventory report shall be made on or before October 1, 1951. The information on this report shall be current as of September 20, 1951. Thereafter, unless additional instructions are given, inventory reports will not be required.

Where an operator fails to file with PAD a Form PAD 16, and subsequently files either a Form PAD-15 or 17, he must attach a Form PAD-16, containing information current as of the inventory date nearest the date of filing. Thus a Form PAD-15, filed May 30, 1951, should contain inventory information current as of March 10, 1951, or any later date; a Form PAD-15 filed June 30, 1951, should contain information current as of June 20, 1951, or any later date. Where a Form PAD-16 is on file there is no need to duplicate the information by additional filings covering the same period.

Four copies of Form PAD-16 must be submitted. The copies must be sent to the Petroleum Administration for Defense, Washington 25, D. C., Att.: Materials Division. If an operator has not filed his inventory report (Form PAD-16) along with his regular requirements (Form PAD-17), he must file the report with his request for emergency requirements (Form PAD-15).

16. **Other regulations.**—This order and all transactions affected hereby, except as herein otherwise provided, are subject to all orders and regulations of the National Production Authority, as amended from time to time. In particular and without limiting the foregoing, the inventory limitations set forth in NPA Regulation 1 as amended from time to time, shall apply, and nothing herein shall authorize an operator to secure material in excess of the inventory limitations provided therein. The rating authorized by this order may be extended and shall be governed by the general priorities procedure set forth in NPA Regulation 2, as amended from time to time. An operator using the rating DO-97 pursuant to this order is not bound by the provisions of NPA Regulation 4.

17. **Need for rating or symbol.**—An operator may not use any rating authorized under this order to obtain material:

(A) For any purpose other than a purpose authorized under this order or in greater amounts or on earlier dates than required for any authorized purpose.

(B) Which can be secured without the use of a rating.

(C) The use of which could be eliminated without serious loss of efficiency by substitution of less scarce material, or by change of design.

18. **Additional priorities restrictions.**—The PAD may issue in its own name further restrictions or limitations on the use of the priorities assistance by operators.

Rating DO-97 for MRO material may not be used until March 15, 1951. An operator who has outstanding nonrated orders for MRO material on the effective date of this order or who thereafter places such orders without rating them, may on or after March 15, 1951, apply DO-97 to them.

19. **Records, reports, and forms.**—(A) Each person participating in any transaction covered by this order shall retain in his files, for at least 2 years, records of receipts, deliveries, inventory and use, in sufficient detail to permit an audit that determines for each transaction that the provisions of this order have been met. This does not specify any particular accounting method, nor does it require alteration of the system of records customarily maintained, provided the system provides an adequate basis of audit. Records may be ratified in the form of microfilm or other photographic copy instead of the original.

(B) All records required by this order shall be made available at the usual place of business where maintained for the inspection and audit by duly authorized representatives of the National Production Authority or the Petroleum Administration for Defense.

(C) Persons subject to this order shall make such records and submit such reports to the Petroleum Administration for Defense and the National Production Authority as they shall require, subject to the terms of the Federal Reports Act (Public Law 831, Seventy-seventh Congress, 5 U. S. C. 139-139E).

20. **Communications.**—All communications concerning this order shall be addressed to the Petroleum Administration for Defense, New Interior Building, Washington 25, D. C., Att.: Materials Division.

21. **Violations.**—Any person who willfully violates any provision of this part or any other order or regulation of NPA or willfully conceals a material fact or furnishes false information in the course of operation under this part is guilty of a crime and upon conviction may be punished by fine or imprisonment or both. In addition, administrative action may be taken against such person to suspend his privileges of making or receiving further deliveries of materials or using facilities under priority or allocation control and deprive him of further priorities assistance.

Note: The reporting requirements and record-keeping requirements of this order have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

This regulation shall take effect on March 12, 1951.

National Production Authority, Manly Fleischmann, administrator.

Schedule A

Materials for use in production.—Casing—tubing—drill pipe.

Schedule B

Petroleum Administration for Defense Districts.

District 1: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, District of Columbia.

District 2: Ohio, Kentucky, Tennessee, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Oklahoma, Kansas, Nebraska, South Dakota, North Dakota.

District 3: Alabama, Mississippi, Louisiana, Arkansas, Texas, New Mexico.

District 4: Montana, Wyoming, Colorado, Utah, Idaho.

District 5: Arizona, California, Nevada, Oregon, Washington, Territory of Alaska.

Schedule C

Schedule C is applicable to the use of the rating DO-97 for the procurement by an operator of material to be used for administrative operations. Such material consists of office supplies, office equipment and machinery, and the like, to the extent that these materials come within the definitions of maintenance and repair and operating supplies set forth in the order.

The rating DO-97 for material to be used for administrative purposes may be used pursuant to the provisions of Section 4 (B) only if the operator has a quota as established through this schedule.

Types of Quota

An operator may elect one of the three types of quotas described below. If an operator elects or obtains permission to use any one of the three quotas, he may not change to either of the other two without obtaining the permission of the PAD.

(A) **Standard quota.**—The standard quota is one-fourth of the dollar amount which the operator spent during the calendar year 1950 for MRO material for administrative operations. If he operated on a fiscal-year basis, it is one-fourth of the dollar amount spent for MRO material for administrative operations during the fiscal year ending nearest December 31, 1950.

(B) **Seasonal quota.**—The seasonal quota is the dollar amount which the operator spent during the corresponding calendar quarter of the calendar year 1950 for MRO material for administrative operations. If he operated on a fiscal-year basis, it is the dollar amount spent for MRO material for administrative operations during the corresponding quarter of the fiscal year ending nearest December 31, 1950.

(C) **Administrative quota.**—The administrative quota is the quota determined by PAD which the operator may use in lieu of either the standard quota or season quota.

How to Obtain an Administrative Quota

The administrative quota must be applied for. It is designed to provide relief where an operator was only in partial operation in 1950, did not operate at all in 1950, or has had such expansion of operations since 1950 that neither the standard quota nor seasonal quota properly represents the operator's demands for MRO material to be used for administrative purposes. To procure an administrative quota, an operator must file with the Petroleum Administration for Defense, Att.: Materials Division, four copies of a letter setting forth in full the circumstances as to his operations which make inappropriate the use of either the standard quota or the seasonal quota. An operator may use only a standard quota or seasonal quota until he has received from the Petroleum Administration for Defense authority to use the administrative quota.

Materials Plan

All requirements to be covered by CMP, PAD says

WASHINGTON.—Petroleum Administration officials anticipate that all materials requirements of all branches of the oil and natural-gas industries will be covered by the controlled-materials plan which is scheduled to go into operation July 1 but do not expect that any further specific orders allocating steel or equipment for the industry will be

issued by the National Production Authority in the meantime.

Pending the adoption of the CMP, Frank Watts, director of PAD's materials division, is giving spot assistance to industry members who encounter definite shortages.

The biggest supply headaches have been in oil-industry tubular goods and well-head equipment. The former will be taken care of by M-46 order from NPA and the latter is covered by a directive to steel manufacturers to set aside 17,000 tons of steel for flow tanks, gas separators, and other well-head equipment which operators can secure on certificates issued by PAD upon application.

Everything covered.—The CMP will cover everything used in the industry from drilling bits to filling-station needs, and PAD already has furnished NPA with detailed figures and supporting data on the material requirements of every branch of the industry.

It was anticipated originally that a CMP would not come until late in the year, and PAD accordingly planned to seek specific NPA orders taking care of the industry's steel needs. As the tightening steel supply situation made it necessary to advance the date for CMP, this plan had to be dropped except for the tubular-goods program, which had to go along if production activities were to be maintained.

Officials confident.—While PAD is receiving a large number of complaints of inability to procure needed materials and equipment from practically every branch of the industry, officials are confident that the situation can be dealt with under the present system of giving assistance to applicants on an individual basis.

It is pointed out that a large proportion of the cases submitted can be taken care of under the MRO order recently issued by NPA. Under that order, any operator or refiner needing materials or equipment for maintenance, repair, or operation was given the right to use a priority to secure it. All that is necessary is to write on or append to the order a signed statement that it carries a rating of "DO-97, Certified under NPA Regulation 4."

In the times ahead, everyone in the petroleum industry has a selling job to do—a selling job to the Government, to the steel people, to other suppliers for both domestic and foreign operations, with respect to the complexity and expansion needs of the industry. If we accomplish this, Watts continued, then our supply job will be much easier. Petroleum materials supply is handicapped by a feeling that regardless of the emergency there will always be sufficient oil for all needs, civilian and military, he said. In short, oil supply is taken too much as a matter of fact.

Program progresses.—PAD is moving step-by-step in its program to provide for operators, equipment manufacturers, and others, Watts said. A procedure is to be worked out to provide materials for projects such as refineries and gas-transmission systems. All these are steps designed to move from dislocated control over to a controlled-materials plan, particularly by the third quarter and wholly by the end of the year.

If the industry finds the new PAD 15, 16, and 17 orders too simple, then it can blame the industry advisers who were brought in to assist with their formulation, Watts told the group. He said PAD was ready to discuss problems with any operator, that it welcomed constructive suggestions, and believed it could take criticism.

Tubular Goods Output

Production is below what must be supplied if oil needs are to be met, Frank Watts of PAD tells New York Nomads

Dahl M. Duff

NEW YORK. — Current production of tubular goods is considerably below what must be supplied if essential needs for petroleum are to be met, but the Petroleum Administration for Defense is making every effort to raise tubular output up to required levels in the next few months, Frank A. Watts, director of the materials division of PAD, said last week.

To meet the drilling requirements of the industry, 157,500 tons of tubular goods must be turned out monthly, he said. Last year's production was slightly more than 150,000 tons a month, but it began dropping off last fall and is now at a rate of 129,000 tons a month.

Watts indicated production the first few months of this year was not at the rate originally hoped for or planned, but said it was anticipated that April production would be 142,000 tons, May 146,000 tons, and in June, up to the required 157,000 tons.

Speaks to Nomads.—The PAD official, formerly with Humble Oil & Refining Co., spoke before a capacity turnout at a meeting of the New York Nomads. He discussed the materials outlook in general and reviewed the new PAD Forms 15, 16, and 17 as well as NPA order M-46. *(The Oil and Gas Journal, March 8, 1951, page 58).*

PAD in its materials program started with domestic operations but recognizes the requirements of the industry abroad and that the 3,000 or more wells drilled outside the United States are needed as much as the 43,000 plus planned in the United States, Watts said. It realizes that 1,000,000 bbl. daily is being imported and that the quantity will probably be increased.

The new orders, forms, and regulations can be easily adapted to foreign operations. The allocation program is expected to begin in the fourth quarter for foreign operations, with the agency recognizing there is about a quarter lag in foreign operations because of shipping, scheduling, etc.

"Squeeze play."—Regarding the general materials outlook, Watts said there was a determination on the part of many segments of the economy—labor, business, consumers, and others—to have a normal civilian economy along with the defense emergency. The inevitable result is a squeeze on critical materials, and petroleum is one of the industries being squeezed.

There will be a period of chaos and dislocation for the industry, Watts said. It will be much less than during the last war, but it cannot be avoided completely. At this time, no one can say for sure whether it will be over by the third quarter or at some later time, he said.

New Orders

More rules issued on use of various materials

WASHINGTON.—The following orders have been issued by the National Production Authority:

Order M-44, March 5: Requiring manufacturers of heavy power equipment to file monthly reports of orders on hand and production and delivery schedules, and providing that NPA will assist manufacturers by allocating steel, copper, and aluminum required to maintain production.

Order M-47, March 7: Limiting the use of iron and steel in the manufacture of certain products.

Amendment to Order M-5, March 7: Providing for an increase of 5 per cent in supplies of aluminum to independent, nonintegrated primary aluminum fabricators to fill DO-rated orders.

Order M-48, March 8: Placing bismuth under strict conservation control, effective April 1.

Amendment to Order M-34, March 8: Permitting the sale of leather whole stock through intermediaries in order to maintain normal channels of distribution.

Amendments to Orders M-7 and M-12, March 9: Continuing through the second quarter the present level of aluminum consumption of 65 per cent of the rate of consumption in the

first 6 months of 1950, and reducing the permitted use of copper from 80 to 75 per cent of the base-period consumption, except that producers of brass and copper-wire mill products will continue at their current rate of 80 per cent and producers of foundry products at 100 per cent of base-period consumption.

Machinery Branch Formed

WASHINGTON. — The National Production Authority is setting up an oil-field-machinery branch in the construction, mining, and oil-field-machinery division which is to be headed by Neal Higgins, on loan from International Harvester Corp.

The oil-field branch will be headed by W. L. Clark, who served during the war with Petroleum Administration for War, War Production Board, and Office of Price Administration, where he handled the stripper-well subsidy, and more recently has been connected with the Federal Power Commission, working on gas reserves.

Currently, Higgins and Clark are contacting the equipment manufacturers to develop their problems and are expected shortly to have an industry advisory committee set up for conferences on what should be done to meet the needs of oil producers pending the adoption of a controlled-materials plan which now is expected to go into effect about July 1.

Heretofore, equipment manufacturers needing materials they could not secure through normal channels have been taking their problems to Petroleum Administration for Defense, which has been working with NPA to secure relief. Under the new setup, it is expected that PAD will be the claimant agency for oil-field machinery, and NPA will take the steps necessary to see that it is produced, with PAD again taking over to see it goes where most needed.

Fuels Investigation

Senate committee opens study of present and future fuel situation; oil and coal factions clash during hearings

Bertram F. Linz

WASHINGTON. — The Senate interior affairs committee opened its investigation of the present and future fuel situation last week with a round-table discussion of all energy resources, with almost immediate raising of the long-standing controversy between the coal and oil and gas industries over the alleged "waste" of petroleum and natural gas in uses to which coal could be put.

Outstanding developments of the discussion, in which six oil men, five coal men, a representative of the natural-gas industry, and a hydroelectric engineer participated, were:

Expressions of confidence that oil would continue for many years to be found in amounts greater than consumed, that the potential of the submerged lands and Continental Shelf in the Gulf of Mexico is at least as great as that of the adjoining uplands, and that well over 120,000,000,000 bbl. of oil is yet to be found in this country.

Agreement that research on synthetic-liquid fuels should be vigorously prosecuted but that no commercial plants should be built until production is economically feasible.

A forecast that when synthetic fuels come into the picture the network of oil and natural-gas pipe lines now spreading over the country will provide a ready-made transportation system for the new fuels.

Disclosure by the Munitions Board that military needs for fuel oil are currently being met but there is a shortage in both tank cars and tankers.

Energy demands.—Opening the sessions March 7, Committee Chairman Joseph C. O'Mahoney, of Wyoming, pointed out that the population of the United States has doubled in the last half century but demand for energy has quadrupled. Stressing that he is "not impressed by the prophets of doom," the senator said that we no longer outstrip the rest of the world together in oil reserves although we have about 90 per cent of the natural gas and great possibilities in hydroelectric power, and the time has come when our energy resources should be evaluated so that we can plan for the future.

O'Mahoney then read into the record a letter from the Munitions Board giving its views on the various fuels. In summary, the board said:

Coal plentiful.—Coal is the nation's largest fuel resource, available quite generally except in the West Coast states, and should be employed, as far as practicable, at all military facilities as well as military-sponsored industrial facilities.

The popularity of natural gas is expanding its use at such a rate that demand may outrun the great expansion in pipe lines and distribution systems.

Fuel oil has been abundant the past 2 years, especially in seaboard areas, but under the stepped-up defense program the situation is changing. Petroleum products will be in great demand. There is a shortage of both tank cars and tankers, and for this reason the use of heating oil and fuel oil should be kept to the practical minimum.

In general, the board held, first preference should be given to the use of coal, second preference to natural gas, and third preference to fuel oil.

Ball testifies.—Going around the table, O'Mahoney called first on Max W. Ball, Washington oil and gas consultant and former director of the Oil and Gas Division. Ball expressed confidence that given manpower and a favorable economic climate discoveries of oil and gas will increase over a number of years to come, and more will be found than has so far been discovered.

Eventually, however, Ball admitted, the law of diminishing returns will come into operation and it will no longer be economic to search for and develop petroleum. Then, he said, human resourcefulness "will replace oil and gas with something more abundant and possibly something better."

Tidelands.—Drawn by Sen. Russell B. Long of Louisiana into a discussion of the potentialities of the gulf submerged lands, Ball and A. Jacobsen of Amerada Petroleum Corp., who was sitting nearby, explained it is believed the underwater lands are at least as prolific as the adjacent uplands but Jacobsen conceded that the cost element will prevent intensive development in the deep Continental Shelf water although, he said, oil is undoubtedly there.

From the point of view of reserves, and lumping all the Middle East countries together as a group, Jacobsen said in response to a question by O'Mahoney, we will not discover more oil than is expected to be found there but will continue to find at a rate enabling us to remain the largest producer in the world. It is not reserves alone that are most important, but the ability to produce, it was brought out. The "very cheap" oil of foreign countries is becoming increasingly expensive because labor is less efficient, drilling is costly, and the exactions of foreign governments are heavy.

Coal "defensive."—At this point the coal spokesmen launched their drive for congressional aid to recover markets lost to fuel oil. On a "belligerent defensive" throughout the meetings, they constantly challenged the oil industry's figures on reserves and potentialities, bearing down heavily on the contention that present reserves are equal only to 14 years' requirements for oil and 29 years for natural gas.

Declaring there is a "serious imbalance" in the use of fuel resources, Frank Earnest, Jr., president of Anthracite Institute, charged it is a "wasteful use" of oil or gas for heating where coal is available, and taunted the oil industry that coal had to take on a substantial amount of oil business during the war.

Quarreling with the oil men over the relative reserves of coal and oil, C. J. Potter of Rochester & Pittsburgh Coal Co. asserted that any national fuel policy will have to be determined in the light of reserves and in times of peak demand oil and gas have not been adequate. The big investments abroad by the oil industry, he insinuated, have been prompted by a necessity to find additional oil. But Eugene Holman, president of Standard Oil Co. (N. J.), said frankly his company had gone abroad with a hope of making a profit and operated abroad for the world market, including the United States on that basis.

The oil group charged the coal industry with attempting to control the type of fuel the individual consumer could use, which the coal men denied, but O'Mahoney pointed out their views would mean positive intervention by the Government by law in the use of fuels.

Gas expansion.—In a later meeting the discussion got back to this point when the coal representatives attacked the expansion of natural-gas pipe lines, contending they should not be permitted to build to areas now served by coal or, as a sop to the oil industry, fuel oil.

The coal men also taunted the independent oil producers who had supported their effort to limit fuel-oil imports a year or so ago with running out on them, but J. Ed Warren, president of the Independent Petroleum Association of America, who, with Harold B. Fell, executive vice president, and Jacobsen, represented the independents on the panel, declared their views have not changed but imports at current rates are not supplanting domestic production and the domestic industry is in a "rather healthy" condition.

Pipe-line expansion was defended by Paul Kayser, president of the Independent Natural Gas Association, who pointed out that the need for new lines will be determined initially by the Federal Power Commission and a decision as to what projects shall be built will be made by the Petroleum Administration.

Synthetics for backlog.—Kayser agreed with the oil men that the technique of synthetic-fuel production should be developed against the time when new energy sources become necessary, and it was he who pointed out that when that time comes the network of pipe lines now being developed will have reached the areas of synthetic production and can be converted to the transportation of those products.

Defending the Munitions Board report, Rear Adm. B. B. Biggs, executive secretary of the petroleum committee, said "one of the principal reasons for the memorandum is that it would be certainly impolitic at least for the military services to demand liquid fuels for everything, and the basic concept is that we do not feel we should be put in the position of being criticized for not taking advantage of all the fuels in a manner to put the least strain on transportation and make sure that all the assets we have are used in the defense effort."

Production increase.—If necessary, Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.), told the committee, the industry can increase its production by 25 per cent over the 1949 level "without difficulty" and also can raise the 1950 rate by that percentage by adding to refinery and other facilities, and in the event of war an additional 1,000,000 bbl. daily could be obtained by rationing.

Manpower problem.—One of the most important problems, Ball told the committee, is that of manpower. A recent survey which he made, he said, showed that if half of the geologists and geophysicists who are members of the armed reserves or susceptible to draft are taken for military service new discoveries would fall off 15 to 70 per cent in 5 years.

Ball's disclosure of the manpower situation so impressed Sen. Clinton Anderson, of New Mexico, who was presiding at the moment, that he suggested a memorandum be prepared for him which he could submit to the Armed Services Committee.

Competitive Threat Cited

WASHINGTON.—Interlocking relationships among directors of the 1,000 largest United States manufacturing corporations constitute "a threat to competition," it was charged last week by the Federal Trade Commission.

In a report to Congress, the commission also held that competition is further menaced by interlocking directorates between the 1,000 corporations and some 330 nonmanufacturing concerns.

A substantial variety of these connections, the commission said, may be in violation of the Clayton Act but the great majority appear lawful under existing statutes, because the interlocking concerns, though potentially competitors, had not been competitors in the past; because the interlocked concerns were related to each other as actual or potential suppliers and customers, rather than as competitors; because the individuals through whom the interlocking relationships were maintained were officers or stockholders rather than directors, or because the companies involved, instead of having common directors, had directors who were jointly members of the boards of third companies.

Discussing the relationships between companies in individual industries, the commission laid the leading oil companies—Standard Oil Co. (N.J.), Socony-Vacuum Oil Co., Inc., The Texas Co., Standard Oil Co. of California, Standard Oil Co. (Ind.), Gulf Oil Corp., and others—were closely tied together by indirect interlocking directorates or by joint ownership of affiliates at the time covered by the investigation.

Sulfuric Acid Shortage

WASHINGTON.—Government officials issued a warning this week that industrial use of sulfuric acid will have to be curtailed because of the shortage of raw sulfur.

Details of the situation were laid before a group of sulfuric acid producers by the National Production Authority at a meeting called to discuss a program for allocation among the principal consuming industries.

Present indications are that sulfuric acid will go under direct allocation about April 1, after a survey of the consuming industries now under way has been completed. The NPA has sent out forms to manufacturers asking for information on schedules of deliveries and scheduled end-uses, and the Petroleum Administration is compiling figures on the requirements of oil refiners for the acid.

Sending a questionnaire on sulfuric acid to refiners, Deputy Administrator Bruce K. Brown said it is expected the oil industry will be able to assist the curtailment of consumption by reducing its less essential uses.

The current supply of sulfuric acid is at least 15 per cent below requirements, Brown said. The petroleum industry is a major consumer, using over 12 per cent of the total United States consumption last year in direct refining uses in alkylation, light product, and lube-oil treating and water treating, and in indirect uses including production of catalysts for reforming and cracking. Production of crude also requires a relatively small amount of acid.

DPA Makes Appointment

WASHINGTON.—Defense Production Administrator William H. Harrison last week appointed Maj. Gen. Thomas F. Farrell as deputy administrator for resources expansion to coordinate and direct the "development of adequate physical resources for defense needs with particular emphasis on early completion of facilities designed to increase basic resources."

Farrell, who has been serving as commanding general of the 301st Logistical Command and as commanding general at Camp Rucker, Alabama, will coordinate all DPA activities in the field of government aids to business, such as direct loans, guaranteed loans, tax amortization, government-furnished plants or equipment, loans other than those under the Defense Production Act, commitments to loan, advances, and progress payments.

XUM

More Drilling Urged

Exploration must be increased if U. S. is to continue to enlarge its capacity to produce oil, A.P.I. group told

Leigh S. McCaslin, Jr.

BEAUMONT.—An expansion in exploration and drilling activity beyond the already record levels is imperative if the United States is to continue to enlarge its capacity to produce oil, the president of a large oil company told 650 members of the American Petroleum Institute Division of Production gathered here last week.

J. C. Donnell, II, president of Ohio Oil Co., told his audience, "Our task is to find and develop crude-oil reserves enough to offset current production and to provide for rising demands plus additional volumes to obtain a margin of safety in productive capacity to meet possible sudden huge military requirements."

Assuming that an excess-productive capacity of one million barrels daily is the desired objective, Donnel said the industry must find and develop five to six billion barrels of new crude-oil reserves. To do its job, three factors are highly important to the industry, the Ohio president said:

1. "Funds necessary for the tasks ahead must not be jeopardized by unsound tax policies or price-wage controls which tend to become rigid and inflexible.

2. "The industry must be assured of a steady and adequate supply of steel which must then be used with greater efficiency.

3. "The available manpower must not be unduly disrupted."

Murray speaks. — In another major address, William J. Murray, Jr., member of the Texas Railroad Commission, summarized important developments in oil and gas regulations since the discovery of oil at Spindletop in 1901. Although himself a member of the nation's most powerful oil-regulatory body, Murray issued a strong warning against "regulation for the sake of regulation." He said the present national - preparedness effort is bound to result in increased regulations for the industry. He expressed the hope that any new regulations would be carefully thought out.

Industry's challenge. — Like Donnell and Murray, the third speaker's address pertained to problems of national preparedness. Dean William R. Spriegel of University of Texas College of Business Administration pointed to industry's challenge to develop and maintain high employe morale as a basic factor in weathering controls, shortages, and all the other economic aches and pains which go with preparedness.

Technical papers. — On the technical side, the southwestern engineers heard 11 papers on various phases of production and drilling practices. H. W. Perkins, of Sun Oil Co., Beaumont, summarized information and data on oil-emulsion drilling fluids which has been gathered by an A.P.I. study committee. Perkins concluded that "the use of emulsion muds has definite advantages over ordinary muds in the drilling operation by increasing the drilling rate and bit life, and by minimizing bore-hole troubles. This improvement has been observed with all types of emulsifying agents used in many types of drilling fluids, to which either refined or crude oil has been added. The type of formation drilled influences the degree of improvement."

Perkins recommended that additional information be gathered on the effect of the various types of emulsifying agents, drilling fluids, and oils on geological interpretation, completion operations, and rubber deterioration. With this information, the Sun engineer feels, more exacting recommendations can be made on a particular emulsion mud to produce the best and most economical results for a given condition.

New logging system.—Two Halliburton Oil Well Cementing Co. engineers, R. H. Winn and W. J. Greer, discussed a new electrical well-logging system which has been developed by that company. Known as "FM logging,"

Twelve of the 14 southwestern oil men who, as past district American Petroleum Institute chairmen between 1928 and 1948, were awarded citations for outstanding service March 8 during the annual southwestern district A.P.I. production division meeting held this year in Beaumont, Tex. Left to right, sitting: R. O. Garrett, Arkansas Fuel Co., Shreveport; A. G. Levy, consultant, Houston; E. P. Hayes, The Texas Co., Houston; D. V. Carter, Magnolia Petroleum Co., Dallas; John A. Ritter, Sun Oil Co., Dallas; and R. E. Bridges, Humble Oil & Refining Co., Houston. Left to right, standing: C. E. Sutton, Pure Oil Co., Houston; W. E. Winn, Ashland Refining Co., Dallas; B. J. Dowd, Union Producing Co., Shreveport; E. P. Hubbard, Gulf Oil Corp., Houston; W. V. Vietti, The Texas Co., Houston; and W. T. Doherty, Mound Company, Houston. Absent were R. B. Kelly, Pure Oil Co., Fort Worth; and W. S. Morris, East Texas Salt Water Disposal Co., Kilgore, Tex.

the new system has been used in the Gulf Coast area over the past 2 years. The system is comparable to other electric-logging systems, but employs a new method of transmitting the signals from the exploring electrode to the camera.

The signals are transmitted by frequency-modulated carriers, from which the system gets its name of FM logging. The use of frequency-modulation permits the simultaneous transmission of a potential curve and three resistivity curves over a single conductor cable.

Bit discussed. — John R. Eckel and W. J. Bielstein, both of Humble Oil & Refining Co., Houston, discussed a new nozzle design for jet rotary bits developed as the result of extensive laboratory tests. On a preliminary test in Katy field, Texas Gulf Coast, a bit equipped with the improved nozzles drilled 2,078 ft. at a rate of 25 per cent faster and used 16 per cent less horsepower than a conventional bit in a comparable section of an offset well.

Five Gulf Oil Corp. engineers presented the results of studies conducted by that company in Peach Point field, Texas Gulf Coast, where "particularly troublesome" lost-circulation problems have been encountered. They concluded that whenever the hydrostatic pressure in a well approaches the maximum which the formation will withstand, surge pressures due to pipe movement and rapidly starting pumps may cause a loss of circulation. The data developed showed that surge pressures can be avoided through slowed rates of pipe movement and slow starting of circulation.

G. A. Greve, Baker Oil Tools, Inc., Houston, described to the A.P.I. group a wire-line pressure-setting assembly which has been under development for more than 10 years. It is designed to set tools having opposed slips and can be run in the well on electric conductor cables or a sand line.

"Neutral zone."—A definition for the "neutral zone" in drill pipe and casing was proposed in a paper by A. Klinkenberg, Royal Dutch-Shell, The Hague, the Netherlands. The Dutch author also discussed in detail the nature and practical importance of the various stresses in tubular goods under different conditions of usage.

Two other papers presented at the meeting summarized results of A.P.I. study-group work. They were "Thin Oil Column Completions in Louisiana-Mississippi Gulf Coast Area," by R. G. Loper of Louisiana State University, and "Results of Survey on Primary Cementing Practices," by Louis F. Davis, Atlantic Refining Co., Dallas. F. C. Todd, Battelle Memorial Institute, Columbus, discussed "Design of an Electrical Analog for Sucker-Rod Problems," and C. A. Warner, Houston Oil Co. of Texas, traced developments of the past 50 years in exploration and production technology.

New officers for the southwestern district, American Petroleum Institute, production division, who were elected March 9 at the closing session of the annual meeting, held this year in Beaumont, Tex., as part of the fiftieth anniversary celebration of Spindletop. Seated, left to right: Harold Denton, Sun Oil Co., Beaumont, chairman of the advisory committee; Olin G. Bell, Humble Oil & Refining Co., Houston, district chairman; and W. B. Duncan, Houston Oil Co. of Texas, Houston, vice chairman for Texas Gulf Coast area. Standing, left to right: R. B. Chesney, Sunray Oil Co., Benton, La., district secretary-treasurer; Ben F. Carter, Union Producing Co., Shreveport, vice chairman for Arkansas-North Louisiana area; W. C. Lenz, The Texas Co., Wichita Falls, vice chairman for North Texas area; and E. C. Patton, Jr., Magnolia Petroleum Co., Dallas, vice chairman for North Central Texas area.

Arrangements committee. — General arrangements for the Beaumont meeting were directed by Waldo Wilson, of Wilson-Broach Oil Co., Beaumont. Committee chairmen for arranging the affair included: Olin G. Bell, Humble Oil & Refining Co., Houston; E. Charles Patton, Jr., Magnolia Petroleum Co., Dallas; W. F. Oxford, Sun Oil Co., Beaumont; P. E. Hilton, Baker Oil Tools, Inc., Houston; W. H. Miner, Lufkin Foundry & Machine Co., Houston; and T. F. Hughes, Hughes Supply Co., Beaumont.

New Pool Analyzer

Sun Oil Co. unveils high-speed electronic reservoir device which predicts future behavior of oil fields

Leigh S. McCaslin, Jr.

BEAUMONT.—A new tool for reservoir engineers — an electronic device for predicting the behavior of oil fields—was unveiled here last week at the spring meeting of the Southwestern District, American Petroleum Institute Division of Production.

Sun Oil Co. engineers demonstrated to the industry a high-speed reservoir analyzer for the study of water-drive reservoirs. The highly complicated machine is the result of 5 years' work by the company and utilizes electronic circuits developed during World War II for radar. By simulating an oil reservoir with electrical circuits much of the detailed mathematics which plague the reservoir engineer is eliminated.

A machine of this type was first introduced to the oil industry in 1943 by Carter Oil Co. Sun's development came about as the result of a desire to speed up the action of reservoir analyzers and to provide an everyday working tool for the engineer studying the behavior of oil reservoirs.

Features.—Sun's new high-speed analyzer has a number of interesting features:

1. By means of an oscilloscope (which can be likened to a television screen) the engineer can get an immediate visual picture of the effect of certain factors on reservoir behavior.

2. The analyzer repeats the entire history of reservoir performance cyclically at a rate of 250 times each second.

3. The gas cap of a reservoir can be simulated by the machine.

Speed. — With emphasis on speed, Sun believes that it will be possible to obtain much more data on proper producing methods than in the past. The company anticipates that it will be able with the one machine to make adequate studies of some 60 water-drive reservoirs under the jurisdiction of its Beaumont office. An ordinary

Sun Oil Co.'s new electronic "brain" can predict the behavior of water-drive oil reservoirs years into the future. It is designed as simply as possible so that the average reservoir engineer can use it to solve his problems. Here are K. E. Montague and Byron Wiess, Jr., Sun Oil Co., Beaumont, Tex.; and O. L. Patterson, Sun Physical Laboratories, Newtown Square, Pa. Patterson is adjusting an oscilloscope which provides a visual picture of reservoir behavior.

problem can be set in the machine and solved in an 8-hour work day. This is in contrast to possibly several months by mathematical means.

Typical uses to which the machine will be put include: to determine the maximum efficient-producing rate for a reservoir, to solve material-balance calculations, and to study gas-cap behavior history.

Because the future behavior reservoirs can be depicted pictorially by the machine, Sun expects that it will be helpful in "selling" management, or perhaps royalty owners, on desired producing practices. For example, if the engineers want to gain approval for a gas-injection program, they can show management visually just what the gas will do to future oil production.

Accuracy.—An amazing accuracy has been built into the analyzer. In studying the history of a field 20 years into the future, it will get a figure which is within 3 days of being right. For example, if the machine says that the bottom-hole pressure of a certain field will be 2,050 psi. on March 17, 1970, that pressure will occur within 3 days of that date.

In one test of the analyzer, Sun used a field for which the company had an 18-year production history. The machine was given only the data pertaining to the first 10 years of this period and then manipulated to predict the next 8 years. The predicted pressures after the tenth year were compared with the pressures which had actually been measured in the field. The difference in the predicted value for the middle of the 18th year and the observed pressure at that time was only 12 psi. for a pressure in the vicinity of 2,000 psi.

Demonstrated. — Sun conducted continuous demonstrations of its intricate device throughout the 3-day A.P.I. meeting in Beaumont. In the words of one Sun engineer, "We want industry to look at it, test it, and tell us if it is as good as we think it is." O. L. Patterson, Sun Physical Laboratories, Newtown Square, Pa., and K. E. Montague and Byron Wiess, Jr., Sun Oil, Beaumont, presented a joint paper on the analyzer.

Only one of the machines has been built to date and future plans will probably depend upon industry acceptance. The analyzer was built at Sun's laboratories in Newtown Square, but is set up and will be operated in the company's Beaumont production office.

Warning Issued

Oil industry must expand, Ashland official declares

NEW YORK.—Another warning that the petroleum industry must undertake major expansion of all its facilities to keep abreast of current record-demand increases came last week from J. Howard Marshall, vice chairman of Ashland Oil & Refining Co.

Marshall told the National Federation of Financial Analysts Societies that present requirements are taxing the industry to the utmost and that there is little room left any place along the line from wells to consumers.

Against the 5 to 8 per cent increase anticipated a year ago, demand is now running 12 to 15 per cent above a year ago and possibly even higher, he said. In any other industry, hoarding or scare buying would be suspected, but this is not true in the oil industry. Though there has been some filling up of secondary storage, it is nothing like enough to account for present gains.

Prices.—On the subject of prices, Marshall said that though the market is strong, a small back-away from the present record demand could produce weakness quickly. However, he saw little prospect of that, and said he felt that the price ceilings will be a stabilizing factor.

The industry faces grave difficulties over the next year in materials supply, he told the group. There has been an over-all allocation of steel for the industry but proper distribution will be a problem likely to entail such regulations as those for field well spacing.

Refining.—The necessity of 1,000,000 bbl. daily of additional refining capacity is being talked in Washington, and this will mean more facilities built back into the fields, more imports, and expanded transportation. These requirements for expansion are linked to the present federal tax program, and the Ashland official said he believed Congress would recognize that the nation needs oil too badly to curtail the most potent economic force in the industry—the depletion allowance and expensing of intangibles.

Arkansas Legislation

Gas-measurement law, new unitization bill approved

LITTLE ROCK.—Four bills directly affecting the oil industry, including field-unitization regulations and a revised standard gas-measurement law, were passed by the Fifty-eighth General Assembly of the Arkansas Legislature before adjournment.

The legislature of the nation's tenth largest crude-producing state considered 44 bills of interest to the industry. These included two severance-tax bills and a bill placing a tax of 50 cents per foot on oil pipe lines of 75 miles in length. These detrimental bills however, died on the calendar. The only possible tax measure that could be signed into law by the governor is a state sales tax.

Field-unitization regulations were set forth in Act No. 134 which gives the Arkansas Oil and Gas Commission the right and power to unitize when and where it is deemed necessary for proper conservation. The bill was written by a five-man committee representing various oil and gas companies and was approved by O. C. Bailey, chairman of the Arkansas Oil and Gas Commission.

Provisions. — Under the unitization law, operators representing at least an undivided 75 per cent interest in the field must concur in any proposed

unit agreement. Likewise, 75 per cent of the royalty interests must be in favor of unitization. An added stipulation is that the value of additional hydrocarbons to be recovered from a proposed unit must exceed the additional cost of conducting unit operations. The law does not set up the basis for allocation formulas, but says they must be based on the "relative contribution" of each separately owned tract to the unit operation.

Gas measurement.—Act No. 214 revised the existing standard gas-measurement law which was termed "vague and indefinite in many respects and makes no provisions for the administration of such law." The new law defines a standard cubic foot of gas as being measured at 14.65 psi. absolute and 60° F. It gives the oil and gas commission certain responsibilities in administering the law.

Act No. 28 of the legislature repeals the 40-acre limitation of fixing drilling units by the oil and gas commission. It gives the commission the right to set units of acreage of any amount that it deems necessary to the best interests of conservation.

The fourth law of interest to the industry, Act No. 29, relieves carriers of oil-field equipment and supplies from certain trucking restrictions. It is designed to help the development of oil-producing areas where inadequate roads exist.

New Products Line

Buckeye Pipe Line Co. plans common-carrier line linking seaboard refining centers and Central New York markets

George Weber

NEW YORK.—A common-carrier products pipe line linking seaboard refining centers in New Jersey and Pennsylvania with eastern Pennsylvania and Central New York markets will be constructed next year by Buckeye Pipe Line Co. The new Buckeye system will comprise about 430 miles of line and will cost an estimated $23,400,000.

Financing for the project is expected to be arranged shortly with a group of insurance companies through Kuhn, Loeb & Co., New York investment bankers. Buckeye will submit the plan to shareholders at a special meeting to be held here March 28.

Long planned.—The proposed line has long been planned to alleviate an existing shortage of adequate transportation facilities serving inland New York and Pennsylvania. The new products system will originate at two seaboard points near Linden, N. J., and Marcus Hook, Pa., which represent the greatest concentration of refining capacity on the East Coast.

The present plan calls for construction of a 14-in. line from Linden to Allentown, Pa., where junction will be made with an 8-in. leg to be constructed from Marcus Hook, Pa. From Allentown northward, a 12-in. line will be laid through the Scranton-Wilkes-Barre area to Binghamton, Auburn, Syracuse, and Oswego, N. Y. An 8-in. line will extend from Auburn to Rochester. Although extension of the system to include Buffalo was originally considered and still may be undertaken in the future, the present project will not include Buffalo.

To join Tuscarora.—At Allentown, junction will also be made with the new products line being laid by Tuscarora Oil Co., Ltd., westward to the Pittsburgh area. By tying into the Buckeye leg to Linden, Tuscarora, a wholly owned subsidiary of Esso Standard Oil Co., will obviate the necessity for replacing its old 8-in. lines between Reading and Linden. The new Tuscarora 10-in. and 12-in. products lines now being laid westward from Tuckerton, in the Reading area, will connect directly with Buckeye at Allentown.

Northward from Allentown the pipe line will have a capacity ranging from 40,000 to 50,000 bbl. per day. Six pumping stations are proposed, at Linden, Marcus Hook, Allentown, Auburn, and at two points between Allentown and Auburn. The aerial survey of the proposed route has been completed and work has commenced on obtaining right-of-way.

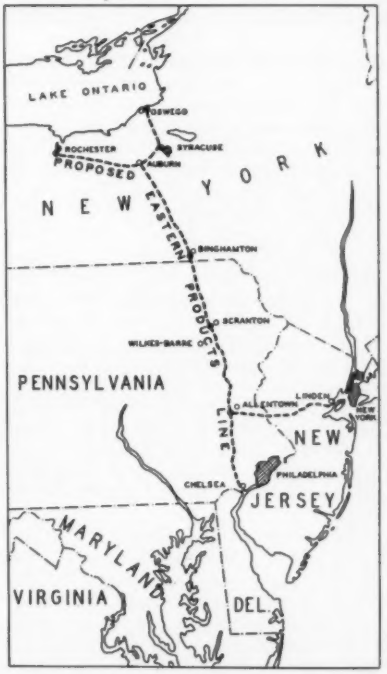
Supervision.—Design and construction of the new system will be supervised out of Allentown. Floyd E. Warterfield, Jr., president of Pipe Line Engineering Co., Dallas, has been retained by Buckeye for planning and engineering the project. Warterfield has opened an office in Allentown, and the company expects to maintain a permanent operations office in that city.

Pipe for the new system has been on order for some time, and will be supplied by National Tube Co. Initial deliveries are expected in about a year, when construction of the Linden-Allentown spread will begin. On completion of that sector, where initial runs are expected for mid-1952, the remainder of the system will be constructed. While the company expects to begin construction of the entire system before the end of 1952, it does not anticipate completing the project before 1953.

Users named.—Among the companies who expect to utilize the common-carrier line are: California Oil Co., Cities Service Oil Co., Cooperative Grange League Federation Exchange, Inc., Esso Standard Oil Co., Hartol Petroleum Corp., Shell Oil Co., Sinclair Refining Co., The Texas Co., and Tide Water Associated Oil Co. These and others will move refined products of East Coast and Gulf Coast refineries to delivery terminals at various points on the system. Extension of the line to the Lake Ontario port of Oswego will permit Canadian oil companies, which import quantities of fuel oil from the United States, to utilize the new transportation facilities. From Oswego, lake shipments will move to consumption centers in New York and Ontario. Barge shipments to Buffalo and Albany will also be possible during the 7-month summer season from points where the system crosses the barge canal near Syracuse and Rochester.

To serve big area.—The new system will handle gasoline, kerosine, No. 2 fuel oil, and diesel fuel. It will serve directly, and indirectly through Tuscarora, an important industrial and agricultural market in Central New York and Pennsylvania. It now appears from estimated throughput figures furnished by the shipper oil companies, that the new system will handle about 40 per cent of all petroleum products marketed in the areas which it will serve directly.

While it will undoubtedly be called the Buckeye System, the new line will be built and operated by three companies. Buckeye will build the New Jersey section. The portion lying within Pennsylvania will be known as Northern Pipe Line Co.,



Route of eastern products line proposed by Buckeye Pipe Line Co.

and the remainder of the system in New York state will be called New York Transit Co., Inc. Both Northern and New York Transit, which operate the eastern sections of the Buckeye system connecting Buffalo with Cleveland, Detroit, Chicago, and Lawrenceville, Illinois, are wholly owned Buckeye companies.

Present system.—Buckeye now owns and operates 3,578 miles of crude-oil transit lines, 276 miles of products lines, and 3,055 miles of crude-oil gathering lines, the latter located in southeastern Ohio. In this common-carrier system which represents a total investment of $45,000,000, Buckeye moved a total of 157,000,000 bbl. of crude and products in 1950, ranking fourth in volume of business among all common carriers. Completion of the eastern system sometime in 1953 may well rank Buckeye as the largest common-carrier pipe-line company.

TECHNOLOGY

Technical Conference

Pacific Coast Gas Association meeting highlighted by symposiums on corrosion, cathodic protection, radio use

D. H. Stormont

LOS ANGELES.—Presented largely in the form of panel discussions, with a minimum of time taken for actual presentation of papers, a highly interesting "technical services" conference was held by the Pacific Coast Gas Association here March 7-8.

Topics receiving most attention were symposiums on corrosion and cathodic protection, operating problems of mobile radio systems, and measurement of stresses in underground piping. Altogether, some 25 technical papers were given at the meeting, of which H. J. Keeling of Southern Counties Gas Co. was conference chairman. Highlights of three papers of general interest are given below.

Concrete pipe coatings.—Problems resulting from galvanic-cell action being set up between concrete-coated steel pipe and bituminous-coated pipe, with a resultant disintegration of the concrete coating, were reported on by David Hendrickson of East Bay Municipal Utility district.

While concrete-coated steel lines have given excellent service, Hendrickson stated they should not be required to withstand the discharge of an electrical current. Due to the alkaline environment created by the concrete coating, the pipe becomes cathodic to pipe lines having other coatings which may develop cracks and expose bare metal. Thus in the design of lines having a concrete coating, prevention of long-line galvanic currents must be considered, he said.

He recommended that caution be used when interconnecting to pipe lines having coatings which might create a galvanic cell. Any stray current on a concrete-coated pipe must be drained off, and any galvanic current must be mitigated by use of insulated joints, he said. Furthermore, he pointed out, the insulated joints should be located as near as practical to the boundaries of different types of soils.

Mechanical gas sampling.—Increasing demand for more accurate measurement of the heating value, specific gravity, and other physical properties of natural gas has led to the development of a mechanical sampler. Reported on by W. A. McGlashen and J. S. Powell of Southern California Gas Co., the device operates continuously and automatically over a selected number of days. It causes to accumulate in a portable noninsulated gas-sample container a sample which is more truly representative of the source gas than any obtained by the manual daily "spot" method.

Readily constructed from available materials and parts at a reasonably low cost, the authors said the device consists of a gas-pressure regulator and spring-driven mechanism for the adjustment of a regulator screw at a constant rate. The regulator and drive mechanism samples gas at a rate such that a total increase of about 9 psig. daily is maintained in the pressure of gas within the gas sample container. The mechanism can be adjusted to accumulate, during the 7 days or other period selected, a sample of source gas to any selected final pressure.

The pressure range of the regulator, 0 to 100 psig., was selected, they said, because it was the most satisfactory for field tests. They pointed out, however, that almost any desired range of operating pressure and rate of flow can be obtained by changing the pitch of the regulator adjusting screw or the use of different springs.

Telemetering equipment.—Experiences with a telemetering system which does not use commercial power at the transmitters was described by W. L. Masheter of Southern Counties Gas Co. The problem involved was the telemetering of inlet and outlet pressures from remotely located pressure limiting stations on the 30-in. Blythe-Los Angeles line to recording receivers in Los Angeles.

After considering several possible means of driving the cam of the metameter transmitter, which must be driven at constant speed, chronometrically governed d.c. motors were chosen. These he said have given very satisfactorily service, using standard six-volt automobile storage batteries as the power source. Through using a gas-pressure-actuated timing device, both the inlet and outlet pressures are being alternately transmitted with only one transmitter.

WEST COAST

Compressor Work Started

SAN FRANCISCO.—Construction on two new compressor stations for Pacific Gas & Electric Co.'s big 34-in. natural-gas line from Topock, Ariz., to the Bay area has been started and work on a third station shortly will start. When completed this fall they will permit deliveries of gas from Texas and New Mexico to be doubled to 400,000 M.c.f. daily.

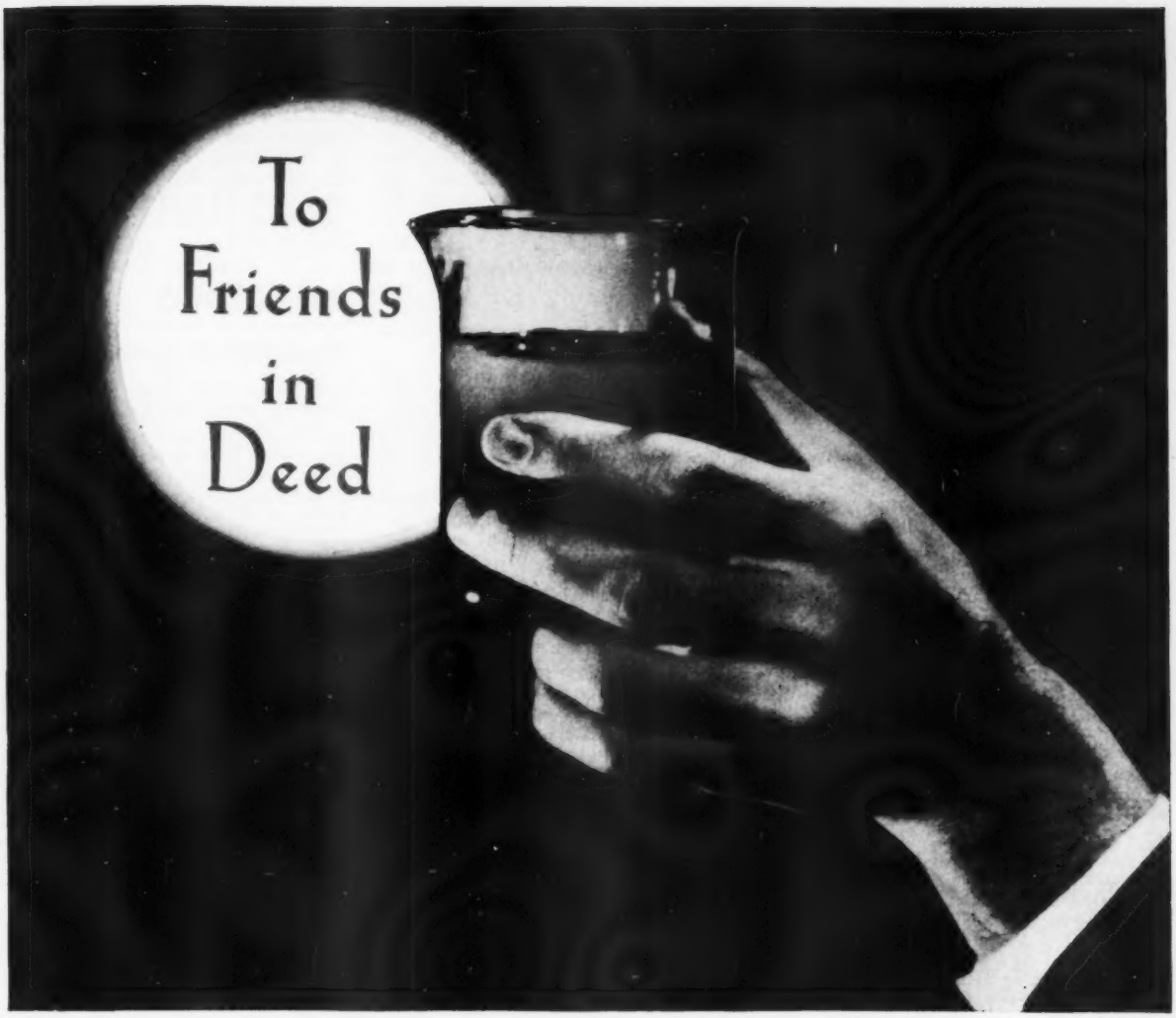
On the California side of the Colorado River across from Topock, six compressors with a total capacity of 15,000 hp. will be installed. At its Hinkley station 8 miles west of Barstow seven compressors totaling 17,500 hp. are to be put to work. Preliminary work on these two stations has been started. Adjacent to its existing compressor plant at Kettleman Hills, P.G.& E. also will place eight compressors with a combined capacity of 12,320 hp.

Cooling towers, water-treatment plants, oil-storage facilities, warehouses, garages, shops, and offices at each of the three stations will add to the size of the installations, total cost of which will be $12,000,000. Bechtel Corp., which constructed the 502-mile "Super Inch" line, also is building the compressor plants.

Property Sale Under Way

LOS ANGELES.—Negotiations for the sale of Universal Consolidated Oil Co.'s properties in the Coalinga Nose field to seven companies which have a unit operation under way there were reported last week to be nearing the signing stage. Because of the "nuisance" value of the six producing wells on the property, the consideration involved is expected to be fairly stiff—possibly around $25,000,000 based on the present price of Coalinga Nose crude.

The Consolidated properties lie on the southwest edge of the Fresno County field, outside of the unitized area in which a pressure-maintenance program is being attempted. Initiated last April, gas-injection activities



SEVERAL months ago a basic chemical shortage, created by strikes, caused Nalco a great deal of difficulty in supplying adequate quantities of water treatment chemicals to established users.

Uniformly, Nalco System users displayed a wonderful cooperative spirit and understanding patience during this trying period.

We wish to take this public means of thanking and expressing our pride in our friends in deed—and to note with satisfaction that not a single shutdown was reported as being necessary because of an inadequate supply of Nalco chemicals.

With the immediate prospect of greater military and defense uses of many chemicals, it is particularly reassuring to know that Nalco and Nalco System users have a fully demonstrated ability to work closely together in turning adversity into success.

NATIONAL ALUMINATE CORPORATION

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THE *Nalco* SYSTEM • Serving Industry through Practical Applied Science

were suspended in January because crude was being driven down-structure to the Consolidated properties.

Companies participating in the Coalinga Nose unit are Standard Oil Co. of California, Superior Oil Co., The Texas Co., Honolulu Oil Corp., Seaboard Oil Co., McAlester California Oil Co., and Los Nietos Co. The latter, a wholly owned subsidiary of Union Oil Co., is the operator.

Because they are desirous of continuing the injection program the companies were said by one source as being agreeable to meeting Consolidated's price. This was reported to be the delivery of 10,000,000 bbl. of Coalinga crude over a 12-year period, or some $25,000,000 based on present prices.

The six Consolidated wells have consistently been produced at higher rates than the 96 producing wells in the unit. During December, for example, the six wells averaged about 700 bbl. daily, or more than 500 bbl. per well daily over the MER recommended by the conservation committee. Average production of unit wells, which have been reduced in number from 154 to 96 following unitization, during this time was about 400 bbl. daily.

GULF COAST

Tidelands Work Extended

WASHINGTON.—With legislation providing for "interim" federal management of the Texas and Louisiana submerged oil fields cooling off in the Senate interior affairs committee, Interior Secretary Oscar L. Chapman last week extended the period for continuance of oil and gas operations until May 8.

This was the second extension of the original authorization issued last December 11 for a 60-day continuance of operations. The first extension, issued February 2, was for only 30 days, apparently in anticipation that action might be taken on the legislation within that period.

The new order permits continuance only of operations heretofore under way, and specifically does not authorize the drilling of or production from any wells on which drilling had not been started on or before December 11, 1950, the date of the Supreme Court decrees.

McCarthy President Named

HOUSTON.—Warner H. Mendel, of New York City, associate counsel of Equitable Life Assurance Society of the United States, has been elected president of McCarthy Oil & Gas Corp., replacing Glenn H. McCarthy. McCarthy, founder of the company and former president, becomes chairman of the board.

This comes on the heels of two other major shakeups in the McCarthy companies.

At a meeting of directors of New Ulm Corp. and McCarthy Chemical Corp. January 12, Russell M. Riggins, accountant and representative of Metropolitan Life Insurance Co., was made president of both firms, and McCarthy became chairman of the board of the companies.

Last July, Metropolitan loaned McCarthy $5,000,000 for development of New Ulm field, and at that time New Ulm Corp. was formed. That firm also owns the McCarthy Chemical plants at Winnie, Tex.

McCarthy Oil & Gas Corp. holds all oil and gas properties of the McCarthy interests except New Ulm field. They include Collins Lake, Winnie, Big Hill, and West Beaumont fields.

Not included in the companies is the Shamrock Hotel, built by McCarthy, who is president.

SOUTHWEST

Minimum Gas Price Asked

AUSTIN.—In a special hearing before the Texas Railroad Commission, royalty owners in Carthage field of Panola County asked for a minimum price for gas.

The commission has never explored its possible power to fix minimum gas prices. Commission Chairman Olin Culberson said the hearing was held "on the theory that every petitioner for redress should be heard."

Several bills have been introduced in the current session of the Texas Legislature to set a minimum gas price. This interest in price follows a recent United States Supreme Court decision which upheld the right of the Oklahoma Corporation Commission to set a minimum gas price.

Wildcatting Better in 1951

AUSTIN.—Figures released by the Texas Railroad Commission this week show that the state's wildcatters are doing better this year than in 1950.

Of 567 wildcats drilled so far, 23 per cent have been producers. Out of 420 drilled by the same time in 1950, only 19 per cent were completed as producers.

CANADA

Four Oil Sections Formed

TORONTO.—Dr. O. B. Hopkins, director of the newly created Petroleum Division of the Department of Trade and Commerce, has announced the formation of four sections of the division.

Division heads, loaned by their companies, are: Refining section, D. M. Morrison, Shell Oil Co., Montreal; producing section, Ralph F. Will, Calmont Oils, Ltd., Calgary; materials section, Harold E. Saunders, McColl-Frontenac Oil Co., Montreal; supply and transportation section, G. S. Hanna, British American Oil Co., Toronto. Walker L. Taylor, Imperial Oil, Ltd., Toronto, will serve as eastern representative for the producing section.

MEETINGS

Production Program Set

AMARILLO.—Program for the 1951 meeting of the Mid-Continent district of the American Petroleum Institute division of production to be held here March 21-23 has been announced as:

"Wells Can Drain Larger Areas," George Elliott, Phillips Petroleum Co., Bartlesville, Okla.; "Metallurgical Factors Affecting Drill-Collar Performance," R. J. Stoup, Spang-Chalfant Division, National Supply Co., Ambridge, Pa.; "The Value of Agents for Control of Silicate Swelling in Acidizing Operations," P. H. Cardwell, Dowell Incorporated, Tulsa; "Applications of Reservoir Data to the Prediction of Water-Flood Behavior," Chester L. Brown, Continental Oil Co., Ponca City, Okla.

"Counterbalancing of Beam-Pumping Units," D. O. Johnson, Johnson-Fagg Engineering Co., Tulsa; "Review of Development in Quantitative Interpretation of Electrical Logs," Sylvain Pirson, Stanolind Oil & Gas Co., Tulsa; "A.P.I. Code 32 (Testing of Cements)—Its Application and Limitations," George C. Howard, Stanolind Oil & Gas Co., Tulsa, and J. B. Roberts, Lone Star Cement Corp., Dallas; "Use of Decline Curves in Water-Flooding Operations," John Buckwalter, Ryder-Scott Co., Bradford, Pa.

"Some Aspects of Bore-Hole Drift," G. C. MacDonald, Gulf Oil Corp., Tulsa, and Arthur Lubinski, Stanolind Oil & Gas Co., Tulsa; "Effects of Sodium Chloride on Oil-Well Cements," N. C. Ludwig, Universal-Atlas Cement Co., Buffington, Ind.; "Progress Report—Hildreth Unit Water-Injection Project," W. W. Wilson, Continental Oil Co., Ponca City, Okla.; "Selection and Evaluation of Wells for the Hydrafrac Process," Tom E. Morton, Dallas, and Joe Maley, Oklahoma City, both of Halliburton Oil Well Cementing Co.; and "Simultaneous Radiation Logging."

North Texas Group to Meet

WICHITA FALLS, Tex.—The twenty-first annual meeting of the North Texas Oil and Gas Association will convene here on March 24 when delegates will register at the Kemp Hotel.

The program is as follows:

Technical session, 9:30 a.m., Kemp Hotel: "Repressuring Results — Hull-Silk Field," I. E. Curtis; "Commencement of Water Flooding in the K. M. A. Field," W. C. Krog; "West Burkburnett Pilot Water Flood," W. H. Bowie; "How the Bureau of Mines Serves the Great Southwest," Dr. C. W. Seibel; "Conclusions From Experience," Dr. Herman H. Kaveler; "The Role of the Railroad Commission in the Present Emergency," Olin Culberson.

General session, 2:00 p.m., Kemp Hotel: "Tubular Goods for the Independent," Bryan W. Payne; "Your Stake in Your State Government," Sen. George Moffett; "Our Daily Oil Reserve Producing Ability in the United States," Gen. E. O. Thomoson.

Banquet meeting, 6:30 p.m., University Center Building: "Think—Plain Talk—Act," Bernard L. Majewski; "Some Problems of Our Economic Destiny," R. B. Anderson.

INTERNATIONAL

EUROPE

"Journaltour"

Valid passports will be required of those making trip to Third World Petroleum Congress via "Journal Special"

VALID United States or Canadian passports will be required of those who travel to the Third World Petroleum Congress at The Hague, the Netherlands, May 28-June 6, via "The Oil and Gas Journal Special," a specially arranged airplane "packaged tour" being prepared by The Journal in collaboration with Pan American World Airways and American Express Co. However, United States citizens holding passports will not be required to have a visa for visiting the Netherlands, Belgium, France, or Great Britain—countries on the itinerary.

It takes from 2 to 3 weeks to obtain a passport, and those who plan on traveling to the congress via the special plane are urged to contact the U. S. Department of State, Passport Division, Washington, D. C., or the clerk of any federal or state court soon. Passport application fee is $10, and two recent photographs, 2½ by 2½ in. in size, are required.

Vaccinations. — United States public health regulations require that returning passengers from Europe submit a certificate from a competent physician that their last vaccination took place within a 3-year period, and stating the type of reaction, such as "reaction of immunity," "accelerated reaction (vaccinoid)," or "typical primary vaccinia."

The package plan covers a 22-day escorted tour conducted by American Express. In addition to including the petroleum congress at The Hague, the tour will feature visits to Belgium, Paris, and London. *(Program of the petroleum meeting and itineraries of the additional European tour were published in the March 1, 1951, issue of The Oil and Gas Journal, page 32. All reservations and ticket sales for the trip are being handled through American Express Co., 1409 Commerce Street, Dallas, by District Manager Frank W. Erickson).*

One-price ticket.—The one-price ticket includes air transportation for the tour, starting at New York and returning to New York. All railway transportation, first-class on the Continent. and motor transportation involved in the European itinerary are included, as well as all hotel accommodations at first-class hotels, and Continental (plain) breakfasts. The sight-seeing programs in the itinerary are included, as are services of an English-speaking guide and entrance fees to places of interest; transfer services between railroad stations and hotels, and vice versa; and all taxes and gratuities throughout the European journey. Individuals pay only for services which are strictly personal and exceptional.

Baggage limit. — Travelers on The Journal-Pan American-American Express tour come under the designation of "international travelers," and, as such, are allowed a maximum of 66-lb. baggage weight for air travel without excess-baggage charges.

The petroleum congress is to be held in Scheveningen, the seaside resort of The Hague. The Netherlands Government has granted permission for the opening session to be held in the Ridderzaal (Hall of the Knights) in The Hague. The plenary sessions will take place in the Kurhaus, Scheveningen, while the sectional meetings will be held in the Kurhaus and in the Palace Hotel.

Excursions.—During the congress members and their ladies will be able to take part in a number of excursions to be made to industrial and tourist centers in the Netherlands. These technical and tourist excursions are being arranged by the excursion section of the organizing committee of the Third World Petroleum Congress.

There are a total of 14 technical excursions arranged for, including Schoonebeek oil field (Nederlandse Aardolie Maatschappij), refineries of N. V. De Bataafsche Petroleum Maatschappij (Royal Dutch-Shell Group) and Caltex at Rotterdam-Peris; Royal Dutch-Shell Laboratory, Amsterdam; and Royal Dutch-Shell Laboratory, Delft. There are also 16 tourist excursions programed to points near The Hague.

Scheveningen beach at The Hague, and the Kurhaus Hotel.

MIDDLE EAST

Middle East Reserves

Area is logical source from which to meet any future increases in crude demands, Aramco official declares

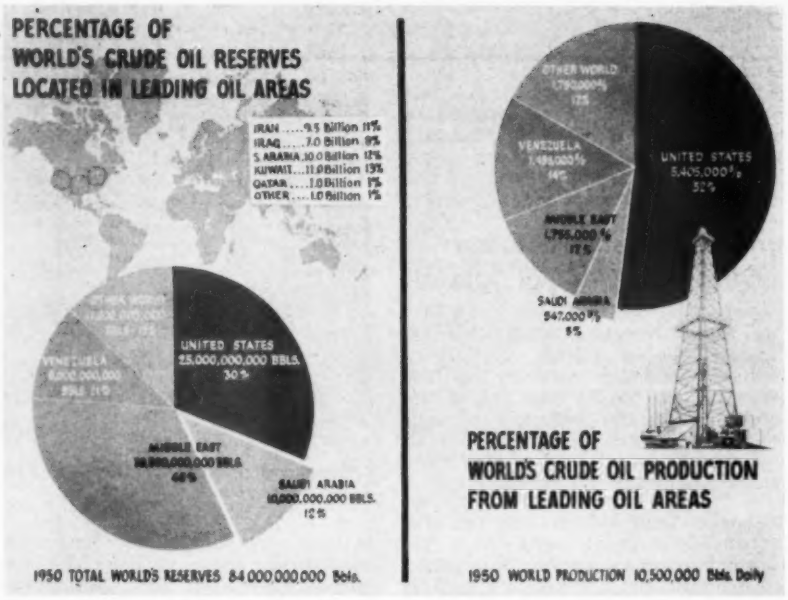
Dahl M. Duff

NEW YORK.—The Middle East, with reserves now estimated at 39 billion barrels or approximately 46 per cent of the world's known total, is the logical source from which to meet future increases in demand, R. I. Brougham, vice president and treasurer of Arabian American Oil Co., said here last week.

In a review of Middle East oil and the role occupied by his company, Brougham pointed out that Middle East reserves now are one-and-a-half times larger than those in the United States and said that the Middle East estimates are undoubtedly conservative since these fields have not been as thoroughly drilled as those in this country.

The Aramco official presented figures showing that while the United States in 1950 produced 52 per cent of the world's oil, it had only 30 per cent of the world's known reserves. Venezuela likewise accounted for a greater percentage of production than of reserves, but the Middle East, on the other hand, yielded only 17 per cent of world production whereas it held 46 per cent of the known reserves.

Production potential. — The Persian Gulf area appears to have the production potential necessary if excessive depletion of Western Hemisphere reserves is to be avoided or the possibility of rationing in time of crises is to be prevented, Brougham said in his talk at the fourth annual



This chart, among others, was used by R. I. Brougham, Arabian American Oil Co. vice president, during a talk on Middle East oil last week in New York. It illustrates the disproportionate production of the Middle East as compared to its reserves.

convention of the National Federation of Financial Analysts societies.

The importance of the Middle East in meeting future-demand increases is especially true in view of the extreme productivity of the wells in this region, he said. The average well in the Middle East produces approximately 5,000 bbl. daily in comparison with 220 bbl. in Venezuela and 12 bbl. in the United States.

"This means that very much less critical material is required to produce a barrel of oil in the Middle East than anywhere else in the world," he said. "We estimate that it takes roughly three times as much steel to obtain a barrel of new production in Venezuela as in the Middle East and nearly 10 times as much in the United States."

Major outlet. — Europe has always been, and still is, the major and natural outlet for Middle East oil, Brougham continued. Between 1938 and 1949 the share of European imports coming from the Middle East increased from 23 to 60 per cent. Over the same period the portion coming from the Western Hemisphere declined from 76 to 36 per cent. The volume of Middle East oil entering into world trade at the end of this period was five times larger than at the beginning, and the general pattern of petroleum trade continued about the same in 1950 as it had been in 1949. It is too early yet to ascertain the effects of rearmament and stockpiling on this program, he said.

Brougham cited Department of Commerce figures to show that American direct investment abroad in the petroleum industry amounted to approximately 3½ billion dollars as of the end of 1949, and of this, about 45 per cent was in Latin America and 20 per cent in the Middle and Far East. About a quarter of the postwar investment of about 2 billion dollars was in the Middle and Far East.

Defense problems.—In response to a question, he said he was not qualified to discuss defense of the Middle East but that there are a number of known facts about this "from which you can draw your own conclusion." First, Russia would have a serious problem of logistics in moving into the region; second, the Russians know the fields would be of little use to them if they were taken , and third, the nonCommunist West needs Middle East oil.

In his discussion of Aramco itself, Brougham disclosed several facts about this operation not generally known or realized before. Among these were:

Oil Nationalization

Iranian group recommends taking over Anglo-Iranian

NATIONALIZATION of Anglo-Iranian Oil Co., Ltd., was recommended last week by a committee of the Iranian parliament in Teheran.

The committee's action was taken a day after the Iranian premier, Gen. Ali Razmara was shot by a member of a fanatic Moslem sect that had been agitating for nationalization. General Razmara had opposed these demands on ground such action would cost the country four-fifths of its foreign revenue and throw thousands out of work.

The premier's assassination and the possibility of further terrorism apparently increased the chances of full parliamentary approval of nationalization. The committee report was voted by 15 of the 18 members present at the meeting.

Climax of agitation.—Last week's developments climaxed weeks of mounting political agitation against the British-owned company. Anglo-Iranian, with a production of some 700,000 bbl. daily, is the world's largest producing company and at Abadan operates the world's largest refinery.

Observers in the industry termed the situation was deplorable and said Iran could not operate the properties even if they were taken over. The possibility of parliamentary vote for nationalization raised questions of international law and the interests of the British Government as well as those of the entire non-Communist West for which a continuing supply of Iranian oil is vital.

Demonstrations.—Demonstrations against the company were taking place in Teheran. The committee which recommended nationalization asked that its term of office be extended 2 months to study means of carrying out nationalization if it is approved by parliament.

The parliament's oil committee earlier voted against ratification of a 1949 agreement under which the concession would be revised and royalty revenue to the country increased by 50 per cent. Late last month, the British foreign undersecretary, Ernest Davies, told the House of Commons in London that the British Government could not remain indifferent to the affairs of this important British interest.

The British Ambassador in Teheran had discussed the matter with General Razmara and told him the 1949 agreement was, in Britain's view, fair. He called attention to a clause in the concession agreement of 1933 which stipulates: "This concession shall not be annulled by the Government or its terms altered either by general or special legislation in future or by administrative measures or any other acts whatsoever of the executive authorities."

New premier.—Shah Mohammed Reza Pahlevi on March 11 named Hussein Ala, veteran diplomat and noted anti-Communist, as Iran's new premier replacing the assassinated General Razmara. The senate was reported to have unanimously approved his appointment, and the lower house was expected to confirm the nomination without difficulty.

Ala is former foreign minister, and became a national hero in 1946 due to his stand against the Soviet Union before the United Nations during a wrangle over Iran's Azerbaijan Province, which borders the U.S.S.R. He is expected to line up with the West on international issues.

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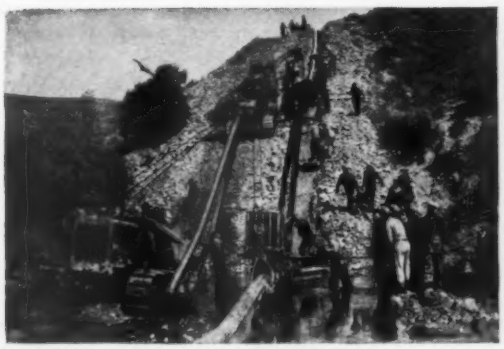

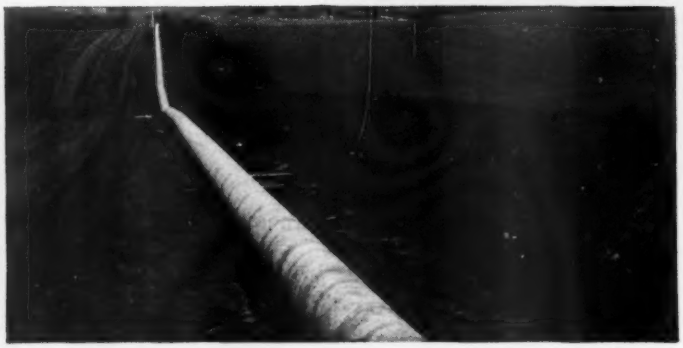

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PERSONALS

Production Veteran

Plummer has been with Pure Oil Co. since 1922

COMER PLUMMER, recently elected senior vice president in charge of production for Pure Oil Co. and a member of the board of directors, has been with the firm or immediate predecessor companies for 28 years, working entirely in the producing division.

Born in Huntsville, Tex., Plummer was admitted to the Texas bar following service in the U. S. Navy in the first World War.

His first oil activity was with Oil States Oil Corp. which was a subsidiary concern of McCaskey & Wentz of Mid-Continent fame. He remained with this company until he joined Humphreys Oil Corp., serving through the various Texas fields including Powell and Mexia, and when Humphreys was taken over by Pure Oil, he entered the Pure service.

He became assistant in charge of the Texas division of the firm, and in June 1927, was transferred from Texas to Oklahoma. He was manager of the firm's southwestern producing division with headquarters at Tulsa for several years before moving to Chicago in 1934 as assistant general manager of production.

He was named vice president in charge of production in April 1947.

E. F. Fullen, district superintendent for Pan American Producing Co. at Kountze, Tex., has been transferred to Easton, La.

Neil S. Whitmore, assistant plant superintendent of Stanolind Oil & Gas Co.'s Slaughter plant at Sundown, Tex., has been transferred to the South Fullerton, Tex., gasoline plant as general supervisor.

Everett J. Carlson is the new district geologist for W. C. McBride, Inc., at San Antonio. He was formerly with Amerada Petroleum Corp. at Midland, Tex.

W. W. Leonard, of Continental Supply Co., Shreveport, is the new chairman of the East Texas section of the American Institute of Mining and Metallurgical Engineers. Other new officers include: **W. R. Myas,** Kilgore College, vice chairman; **W. E. LaRoche,** Tide Water Associated Oil Co., secretary - treasurer; **Bert Crowder,** Humble Oil & Refining Co.; **H. L. Long,** Kilgore Petroleum Co.; **J. A. Walker,** Magnolia Petroleum Co.; and **P. J. Lehnhard,** East Texas Engineering Association, directors.

J. K. Wright, of the Mississippi State Oil and Gas Board, has been elected president of the Mississippi Section of the American Institute of Mining and Metallurgical Engineers. Other officers include: **T. Hardy Jackson, Jr.,** The California Co., first vice chairman; **John A. Rodgers,** Gulf Oil Corp., second vice chairman; **Eugene J. Burnet, Jr.,** Mississippi State Oil and Gas Board, secretary-treasurer; **J. O. Crowe,** Gulf Oil Corp.; and **Pete Moore,** Sohio Oil Co., directors.

Alexander Fraser, chairman of the executive committee and former president of Shell Oil Co., will retire from the firm on March 31. Fraser, widely known in the industry, joined Shell in 1919 and held various executive positions until 1933 when he became president of Shell Petroleum Corp. In 1939 he was made president of the consolidated Shell operating companies, and in 1947 became president of Shell Union Oil Corp., the holding company. When it was consolidated with Shell Oil Co., Inc., in 1949, Fraser was elected chairman of the executive committee of the new company. He will continue to be available to the firm on a consulting basis.

Charles B. Johnson, Jr., formerly chief engineer of The Chicago Corp., Corpus Christi, has been named manager of production and drilling operations. **Roy A Schuster,** general superintendent of plants, is now manager of plant operations and **A. F. Morris** is chief geologist in the Fort Worth offices. Morris has been on the geological staff of Cities Service Oil Co. prior to joining Chicago.

V. M. Brant, formerly assistant chief drilling contractor in Texas for Canadian Gulf Oil Co., has been made assistant manager of exploration. **J. R. Hardie** has been appointed fiscal advisor, and **J. B. Fraser** has been appointed employe - relations advisor. **A. A. Williams,** formerly assistant chief scout, has been made chief scout replacing **R. W. Schweigert** who has been appointed special assistant to the general manager.

A. M. Rippel has been named manager of the natural-gas department for Phillips Petroleum Co., and

RIPPEL

GEORGE P. BUNN

George P. Bunn has been named manager of the natural-gasoline department. These appointments resulted from dividing the natural gasoline and gas department into two separate units. Rippel graduated from Bucknell University in 1920, and was employed by Phillips in 1925 as a valuation engineer in the natural-gasoline department. He became assistant manager of the gas division in 1937, and manager in 1939. Bunn graduated from University of Kansas in 1920, joined Phillips in 1922 as an engineer and office assistant in the natural gasoline department, and later became department superintendent. In 1930 he was named manager.

John M. Schiff has been elected a member of the board of directors of Tide Water Associated Oil Co. Schiff is a partner in Kahn, Loeb & Co., investment bankers.

John O. Barry, consulting geologist at Houston, has moved his office to San Antonio.

L. L. Aubert, president of Bankline Oil Co., has been elected president of Petroleum Production Pioneers, organization of oil men who have been engaged in some phase of California oil business for at least 30 years. Other officers include: **Fritz Huntzinger,** Ventura Tool Co., vice president; **Paul E. Terry,** Capital Co., treasurer; **Dick Sneddon,** petroleum engineer, secretary; **B. H. Anderson,** Continental Oil Co., sergeant-at-arms; and **Paul Andrews,** Signal Oil & Gas Co., historian. **R. A. Broomsfield,** retired executive of the former Barns-

XUM

PERSONALS

dall Oil Co., was named honorary president, and **A. E. Fowks,** retired Union Oil Co. of California executive, was named honorary vice president.

MANLEY

Harold W. Manley, Sunray Oil Corp., has been named vice president of the gas-gasoline-manufacturing department; **R. E. Foss,** Los Angeles, has been named vice president and general supintendent for Sunray's California production division; and **M. Darwin Kirk,** named vice president and general attorney. Manley was graduated from Oklahoma A. & M. College in 1929, joined the former Barnsdall Oil Co. that year, and served as roustabout, division engineer, production superintendent, and a Barnsdall president before its merger with Sunray. Foss was graduated from California Institute of Technology in 1932, joined Barnsdall in 1935 as petroleum engineer, and served as production foreman, drilling engineer. He was named vice president of Barnsdall in 1945. Kirk graduated from University of Oklahoma in 1928, joined Barnsdall in 1932, and was a vice president of the firm at the time of its merger with Sunray.

KIRK

FOSS

Jimmie D. Harrington, former petroleum-research engineer for Magnolia Petroleum Co. at Dallas, has been transferred to Kermit, Tex., as field engineer.

Lee C. Smith has been transferred from McAllen to Midland, Tex., by Sun Oil Co. as district geologist in charge of Midland, Abilene, and San Angelo, Tex., offices. He replaces **W. H. Conkling,** who recently resigned from Sun to become vice president and chief geologist for States Exploration Co. of Texas. **Martin Russo,** resident geologist at McAllen, succeeds Smith as assistant district geologist, and **J. C. Monk,** who recently moved to Abilene from Philadelphia, will be assistant district geologist at Abilene.

C. I. Weaver, chairman of the board of directors and chief executive officer of Ohio Fuel Gas Co., has retired after 20 years as head of Ohio Fuel. Weaver's executive responsibilities are being assumed by **E. C. Overbeck,** who was elected president of Ohio Fuel a year ago. **W. N. Grinstead** is vice president and general manager.

Frederick B. Hufnagel, Jr., formerly assistant coordinator in the marketing department for Sun Oil Co., has been appointed assistant to **R. H. Andres,** director of purchases, with offices in Philadelphia.

Louis Guy Huntley, formerly geologist with Creole Petroleum Corp. in Venezuela, and with Huntley & Huntley, Pittsburgh, has joined Carter Oil Co. in Mattoon, Ill., as production geologist.

F. A. C. Gupin, managing director of Shell Oil Co.'s international-chemical operations, has arrived in this country from London to confer with leading Americans in the petrochemical field on world-wide problems, trends, and developments in that industry.

Owen F. Thornton, formerly senior petroleum engineer with The Texas Co., has joined Louisiana Land & Exploration Co. and will be in charge of the petroleum engineering department. After graduating from Oklahoma A. & M. College he was with Tide Water Associated Oil Co. until 1944.

Charles R. Barr, area geologist for Stanolind Oil & Gas Co. at Midland, Tex., has been transferred to Wichita, Kans., as Kansas district geologist replacing **Tom G. Wright,** who has resigned to engage in consulting activity.

J. E. Bower, district superintendent for Sinclair Pipe Line Co. at Arlington, Tex., has been transferred to Shawnee, Okla., in the same capacity.

Fred L. Oliver, graduate of Texas University geological school, has joined Stanolind Oil & Gas Co. as a geological scout in Kansas, replacing **Lee Cornell.**

W. R. Johnson, North Bay, Ont., manager for Canadian Oil Companies, Ltd., has been appointed divisional manager at London, Ont.

Dr. R. K. Stratford, for many years chief of the research department of Imperial Oil, Ltd.'s refinery at Sarnia, Ont., Canada, has been appointed to the newly created position of scientific adviser to the firm. **Dr. G. W. Gurd,** former assistant research manager, succeeds Stratford. **Gordon McIntyre,** manager of the company's technical division, has been transferred to the head office at Toronto.

Nelson L. Ott, formerly vice president and treasurer of Coastal Oil Co., Newark, N. J., has been elected executive vice president. **Michael Archer,** manager of accounts, has been elected treasurer, and **Robert J. Marron** has been named assistant general manager.

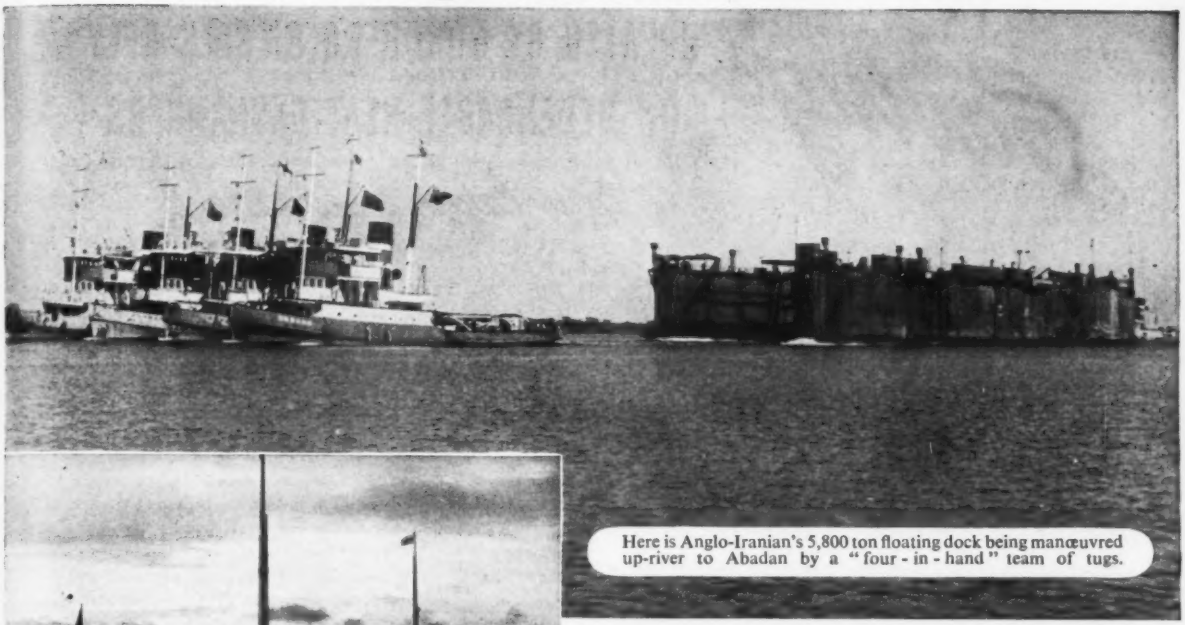
Jack T. Perkins, formerly chief scout for Stanolind Oil Purchasing Co., has joined the oil and gas-loans department of Southland Life Insurance Co., Dallas.

G. E. Canaday, Skelly Oil Co., has been named manager of refineries and gasoline plants, and will be first assistant to the vice president in charge of manufacturing. The manufacturing department of Skelly has been reorganized following the death of E. K. Anderson, general manager of refineries. Responsibilities and duties reassigned include: **J. Y. Haslam,** chief engineer of the manufacturing department, who will additionally assume responsibility for all construction work; **H. H. Belew,** special assistant to the vice president in charge of manufacturing, and assistant to the manager of refineries, who will be responsible for all detailed matters pertaining to refining operations, and will serve as chairman of the Research Coordinating Committee; **L. C. Newton,** who will be in charge of safety and personnel for the entire manufacturing department; **G. D. Tidwell,** who will assume complete charge of automotive equipment and purchase of plant sites and right-of-way for the manufacturing department; and **John A. Craig,** formerly chief engineer of the gasoline and gas division, who is assigned the duties of superintendent of gasoline plants.

Grady E. Johnson, district engineer for Champlin Refining Co. at Oklahoma City, has been transferred to Velma, Okla., as district engineer for the Duncan, Okla., district.

C. L. Summerwell has been named lease foreman in the newly created East TXL area, West Texas district for Phillips Petroleum Co. Other changes in the firm include: **B. J. Howard,** named subforeman in the East TXL area; **W. M. Phillips** named to replace Summerwell as subforeman in the Fullerton area, Hobbs, N. M., district; **Otis Gaines,** transferred to the Hobbs district as lease foreman; and **E. B. Upton,** transferred to the Hobbs district as subforeman.

Ships of the Line



Here is Anglo-Iranian's 5,800 ton floating dock being manœuvred up-river to Abadan by a "four-in-hand" team of tugs.

A vast variety of vessels is afloat in the service of Anglo-Iranian, besides the huge tanker fleet to which the ship on the left now belongs. This is the "British Adventure", launched in December, 1950—of 28,100 tons—the largest tanker so far built in Britain. Even bigger vessels are now on order for Anglo-Iranian's fleet.

Launches for refuelling flying boats.

Fire Drill on board one of Anglo-Iranian's fire floats.

First and Biggest

oil producers in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies also operate twelve refineries in Europe, Middle East and Australia; their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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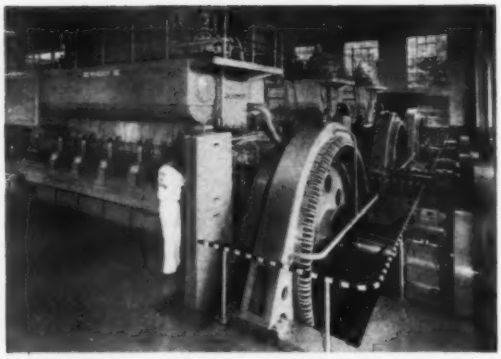
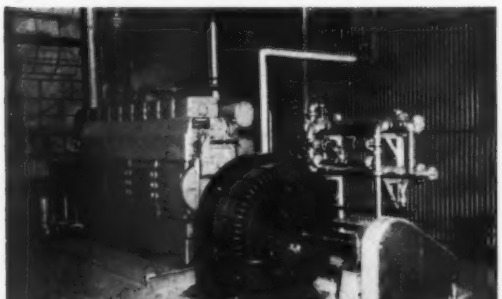
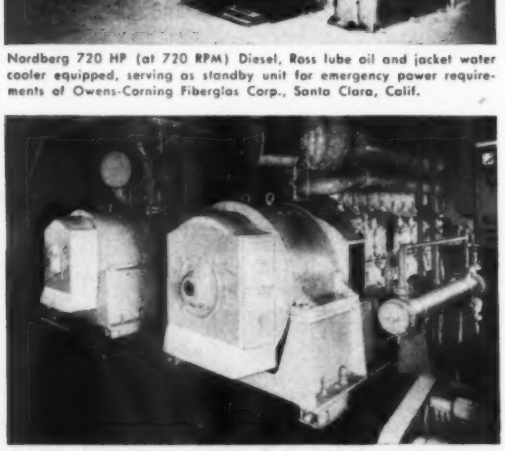


Three 2000 HP Nordberg Diesels, all equipped with Ross lube oil and jacket water coolers, in Houma, Louisiana municipal power plant.



Nordberg 720 HP (at 720 RPM) Diesel, Ross lube oil and jacket water cooler equipped, serving as standby unit for emergency power requirements of Owens-Corning Fiberglas Corp., Santa Clara, Calif.



Two of three 375 HP Nordberg Diesels, all equipped with Ross lube oil and jacket water coolers, generating power for all machinery in U. S. Engineers Mattress Laying Plant along Mississippi River. (Installation on mooring barge).

In industry, municipal power plants or aboard ship, Nordberg Diesel Engines achieve substantial savings in fuel, lube oil, labor and maintenance. "They provide the most economical answer to modern power needs," says Nordberg Mfg. Co. of Milwaukee, Wisconsin.

. . . and in meeting today's demands for adequate power at low cost, Nordberg must place as much importance on the selection of components as it does on its own engineering, design and construction. For clearly, so vital a component as a heat exchanger could well cancel out much of the efficiency of an engine, were its own performance deficient. *Dependable heat exchanger performance is relied on,* TO A LARGE MEASURE!

Therefore, throughout its wide range of two and four-cycle engines, in sizes from 10 to 9600 HP, Nordberg makes extensive use of Ross Exchangers . . . knowing full well that Ross Exchangers as built-in components assure constantly safe and effective temperatures for both lube oil and jacket water . . . and knowing, too, as other leading Diesel builders know, that the Ross reputation for dependability matches its own.

★ ***HELPFUL DESIGN DATA*** For Diesel builder or user, large or small HP ratings, the information in Ross literature will prove of extreme usefulness. Write.

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PERSONALS

Ray P. Walters, geologist with Standard Oil Co. (N. J.), is scheduled to go to France in the near future in connection with the company's newly granted concession for exploration in that country. Walters has served the Jersey Standard organization in Romania, Egypt, and more recently in New York.

C. W. Welch, district superintendent for Sinclair Pipe Line Co. at Wichita, has been transferred to Shawnee, Okla., in the same capacity.

George J. McLernon, formerly petroleum engineer and assistant superintendent for J. E. Crosbie, Inc., has joined Midstates Oil Corp., Tulsa, as a petroleum engineer. A graduate of University of Oklahoma, McLernon has previously been connected with Magnolia Petroleum Co., Transwestern Oil Co., and Sunray Oil Corp.

Charles G. Cary, administrative assistant to the manager of the oil and gas division for Freeport Sulphur Co. at New Orleans, has been named superintendent of the Louisiana district, oil and gas division. He has been with the firm since 1941.

Jess W. Montgomery, formerly foreman for Stearns-Roger Manufacturing Co. at Salt Lake City, has joined Fluor Corp. at Arco, Idaho.

C. C. Dye, petroleum engineer for Quintana Petroleum Corp. at Alvin, Tex., has been transferred to Victoria, Tex., in the same capacity.

J. T. Kelley, assistant general manager for Washington Gas & Electric Co. at Bryan, Ohio, has been transferred to Tacoma, Wash.

H. B. Williams, leadman at Wink, Tex., for Shell Pipe Line Corp., has been transferred to Venezuela as right-of-way inspector. **H. W. McDonald,** tank-farm gager, also from Wink, will be utility inspector, and **H. F. Gazaway,** maintenance foreman, Perry, Okla., will serve as senior inspector.

Harry Blevins, graduate in mechanical engineering from Kansas State College, has joined Cities Service Gas Co. as assistant production engineer at North Hugoton, Kans. Others who have recently joined the firm include: **Earl S. Hanson,** graduate in civil engineering from Kansas State College, assigned to the North Hugoton compressor station; **John Debold,** graduate in civil engineering from University of Kansas, temporarily assigned to the pipe-line division at Wichita, Kans.; **Richard Hus** and **Dean Mullins,** both graduates in civil engineering from Kansas State, assigned to the meter department at Wichita.

D. A. Caldwell has been named chief gager and pipe-line scout for Humble Oil & Refining Co. at Pampa, Tex., succeeding **Charles Alford** who has retired after 31 years with the firm.

B. A. Barnhill, formerly operations superintendent at British American Oil Co.'s Montreal East refinery, has been transferred to the new British American refinery at Edmonton as assistant manager. At the firm's Moose Jaw, Sask., refinery, **J. W. Morgan,** who was administrative assistant to the manager at Calgary, has been named assistant manager, succeeding **C. T. Taylor** who has been appointed assistant construction superintendent at Moose Jaw.

A. C. Green, formerly depot-operations supervisor of the Montreal division, Shell Oil Co. of Canada, Ltd., has been appointed acting operations manager of the division.

L. T. Munn has been named manager of the head-office, chemical-products department, Shell Oil Co. of Canada, Ltd., Toronto.

E. B. Jordon, division superintendent for Sinclair Pipe Line Co., has been transferred from Mechanicsburg, Pa., to Marion, Ohio.

E. D. Newman, formerly division office engineer for Fish Pipeline Construction Co. at Newark, N. J., has joined Brown & Root as engineering head of the United Gas project at Shreveport, La.

Rube M. Hurt, vice president of Big Chief Drilling Corp. at Denver, has moved to the firm's newly established offices at Farmington, N. M.

John Paul Nolley, assistant district superintendent for Humble Oil & Refining Co. at Corpus Christi, has been transferred to the Stratton district, Kingsville, Tex.

Sam T. Boltz, Jr., formerly attending University of Tulsa, has joined The Texas Co. at Caldwell, Kans., as roustabout engineer.

Harold A. Lacik, formerly petroleum engineer with Ohio Oil Co. at McFaddin, Wyo., has joined British American Oil Producing Co. at Casper, Wyo., as assistant to the district engineer of the northwestern district.

Alfred J. Vogel, superintendent of production and drilling operations for Fuhrhan Petroleum Corp. at Andrews, Tex., has been transferred to Midland, Tex., in the same capacity.

Carl A. Lesh, general manager of the Michigan district for D. B. Lesh Drilling Co. at Hart, Mich., has been transferred to Mattoon, Ill., in charge of drilling and production.

DEATHS

E. Holley Poe, 57, a pioneer in the natural-gas industry, died March 9 at Tulsa. He first became associated with the gas industry in 1918 when he joined Tidal Oil Co. In 1942 he joined the Office of Petroleum Coordinator for War. In 1943 he was named executive officer and general manager of the Petroleum Reserves Corp., retiring in 1944. After the war, as a representative of Texas Eastern Transmission Corp. of Houston, he was top bidder for the government-owned Big Inch and Little Inch pipe lines which conveyed oil and gas from the Southwest to the industrial East. After retiring from his governmental duties, he founded E. Holly Poe and Associates, an engineering firm with headquarters in New York, and remained head of that firm until his death.

Harold McClure, Sr., 56, Michigan oil producer, died at Alma, Mich., March 9. McClure was a past president of the Oil and Gas Association of Michigan, and first chairman of the state oil advisory board. He was president of Mercer Oil Co., Inc., vice president of Commonwealth Pipe Line Co., and coowner of McClure Drilling Co.

A. D. Nelson, 60, manager of Magnolia Petroleum Co.'s tax department, died February 28 at Dallas.

Herman S. Simmons, 53, sales manager of Herb J. Hawthorne, Inc., died at Shreveport March 6.

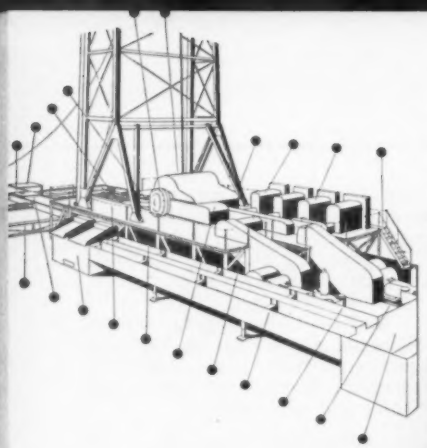
Ernest Stott, 72, owner of E. Stott Petroleum Marketer, Kansas City, died March 6.

Arthur H. Sherwood, 70, eastern district sales manager for Petro-Chem Development Co., died recently in Garden City, N. Y.

Robert A. Mueller, president of Gray Tool Co., died recently in Houston.

Glenn W. Christopher, 64, manager of standard pipe sales for Youngstown Sheet & Tube Co., died in Youngstown, Ohio, February 13.

XUM



1. This rig, operating in Montalvo, California, field where it was used in opening a new 11,800-ft. producing zone, has been modernized under the current program of Rocky Mountain Drilling Co.

2. Another Rocky Mountain Drilling Co. rig which has been modernized also operating in California is shown at work in San Joaquin Valley. The hose which may be seen near the mast leg, supplies lubes under pressure from tanks directly to reservoirs in the drilling engines.

Extensive Rig-Modernizing Program Is Fi

ONE of the most comprehensive drilling-rig modernization and standardization programs ever undertaken has just about been completed by Rocky Mountain Drilling Co., Los Angeles. During the past 15 months each of its 15 rigs has been brought to the company's yard at Bakersfield, set up just as if drilling were to start, and given a thorough face lifting. Many of the unitizing ideas and other features adopted were entirely new, but tried-and-true ones were not overlooked.

Basically, the program carried out was to provide for easier and quicker rigging up and dismantling, to eliminate the need for extensive welding when rigging up, and to permit the rigs to be moved in fewer truck loads. In addition considerable thought and work were devoted toward obtaining more efficient and safe operations while drilling is in progress.

The rigs involved range in capacity from medium to heavy—from 5,000 to 15,000 ft. and deeper—and are the products of several manufacturers. Because of the depth range of rigs involved it was impossible to apply the standardization program 100 per cent. All, however, are power rigs designed primarily for operation with masts so that it was possible to carry out the program to a very high degree.

All work was performed in the Bakersfield yard to preclude the possibility of losing standardization features which are likely to occur if the work is done in the field. As the rigs actually were set up while work was taking place, exact measurements could be made and the equipment correctly fitted together.

The result of this program is readily evidenced by the compact and neat appearance of the company's rigs. More important, however, is the achievement of greater portability and improved drilling performance. Some of the modernization features are shown in the two over-all views. Principal items covered in the program will be described in following paragraphs and accompanying illustrations.

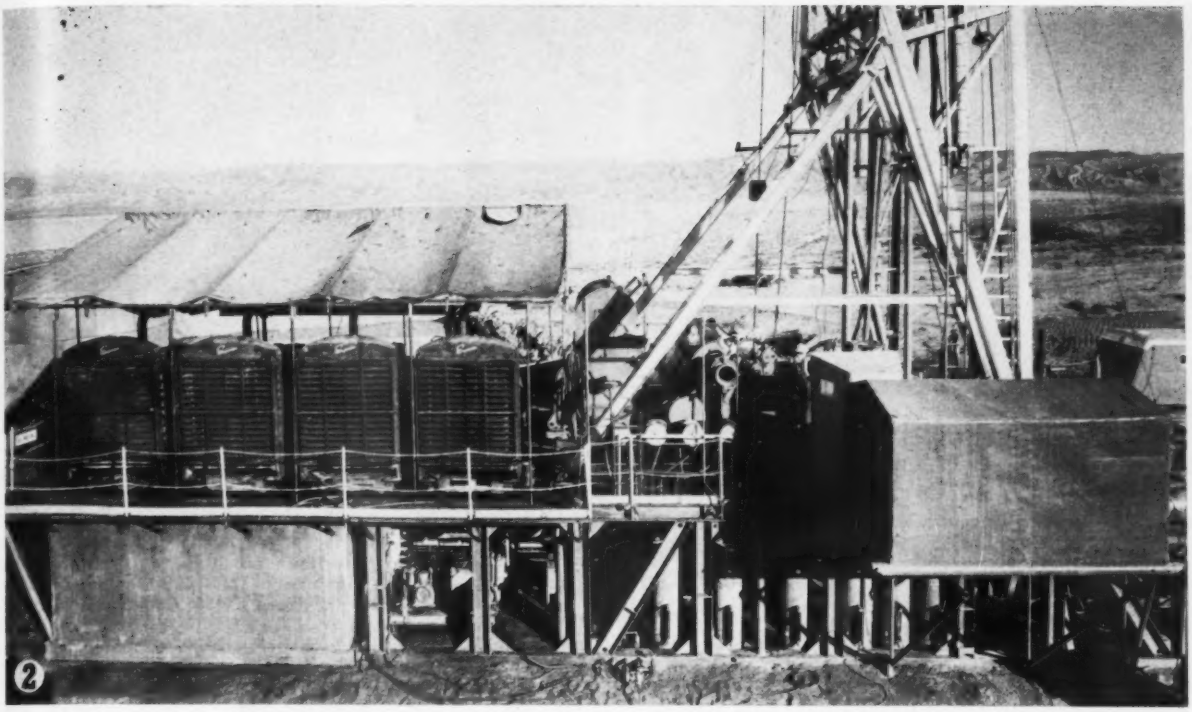
Features of Bases

Designed primarily for use with masts, all bases are 8 ft. 10 in. high so that they provide a one-level drilling platform. However, since the structure of the two bases and their spreaders is 28 ft. wide, a 26-ft.-base derrick can be erected on the rig floor. If a 32-ft.-base derrick is to be used, the bases can be skidded into place between the derrick's legs after it is erected.

Spreader boxes and wedge locks are used so that the two bases can be quickly joined together or separated (see Fig. 3). Water, air, and fuel are transported across this span in joints of pipe cut to length and fitted with quick makeup unions. Other piping necessary to bring the water, air, and gas to the desired points under the rig floor is placed along the inside of the bases. Short lengths of flexible hose are used where possible to connect the pipe to equipment on the rig floor.

Incorporated in the bases are a chemical house, a 2 by 20-ft., 175-psi. working-pressure air receiver, a 5,000-gal. tank for storing hydromatic-brake cooling water, and the mud-line manifold. In addition six 100-gal. lube-oil storage tanks are placed in one base (see Fig. 2). Oil is pumped directly from an oil dealer's service truck to the correct drum. Kept under pressure by compressed air, the lube oils are forced to the rig floor where short lengths of hose permit their transfer directly into other reservoirs.

The rotary table is unitized into a single unit with the beams which support the table. This rotary unit, which also contains the air-operated slips that are fastened to a pad on the rotary table, spans the distance between the sub bases. As it merely rests on each base—no bolts or tie-downs of any kind—the entire unit is easily picked up when a move is to be made.



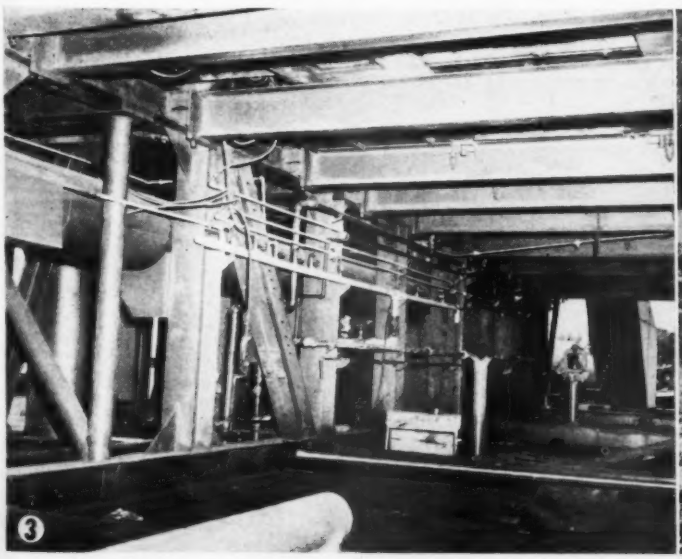
Finished by Rocky Mountain

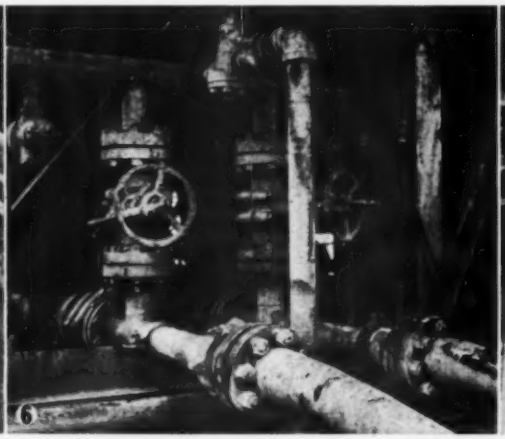
by D. H. Stormont
West Coast District Editor

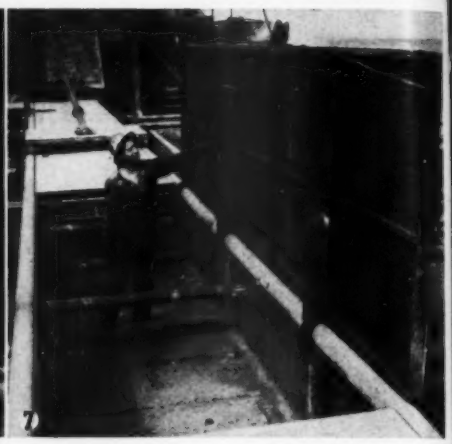
The views shown here indicate some of the ideas which were incorporated in a general modernization and standardization program instituted by a West Coast drilling contractor. Some are entirely new, others tried and true.

3. Underside view of the rig floor. All piping is unitized in the rig base leaving the underfloor area clear of obstructions. Wedge locks on the spreader boxes permit the bases to be quickly assembled or dismantled.

4. By replacing conventional mud tanks with double trenches in which gas, water, and mud lines are unitized, better desanding is accomplished. Baffles trap the sand which is then removed through dumping gates. The 60-ft. trenches break up into two 30-ft. sections to facilitate handling.







5. Portable steel suction tank into which "pill" tank is unitized, eliminating latter as a separate piece of equipment. As in trenches all lines are unitized within tank and provided with quick-makeup union connections.

6. Mud-line manifolds such as this provide flexibility of pumps in mixing, conditioning, and circulating drilling fluid. Being unitized within a subbase, handling of manifold during moves is no problem. Connection hose on discharge lines allows freedom in positioning pumps.

7. Catwalks are fully enclosed so that they serve as storage boxes during moves. Drill-pipe frame serves as a railing for a trolley wagon.

8. This four-wheeled trolley wagon is used in moving pipe from racks to rig floor. By pivoting pipe support on wagon, damage to threads is prevented.

9. Pipe racks break down into single flat sections, permitting entire rack to be moved in one truck load. Pin and hook-type connections permit rack to be quickly erected or knocked down.

10. The pipe-racking platform, a single unit having supporting beams keyed to subbases, provides a well-drained, flush working-surface. Individual oak timbers are turned over, or replaced, when they become severely damaged.

The bottom of each base is equipped with steel bearing plates, eliminating the necessity for wood matting. Where necessary a gravel foundation is prepared for the bases to rest on, but usually this is not required.

Mud Facilities

As shown in Fig. 4, mud-settling tanks have been replaced by double trenches. These, 60 ft. long and divided into two sections of equal length, have been found quite successful in lowering the sand content of drilling muds. Either trench may be used, while the other is being cleaned or if only one is required, or both may be used when two pumps are in operation.

Each of the 2-ft.-wide by 1½-ft.-deep trenches has three low baffles spaced to form four settling basins of about equal length. For each settling basin there is a wide cleanout gate (see Fig. 4) through which collected sand is washed and shoveled from the trench. The time involved in keeping the mud desanded has been found to be much less with these gates than with the ordinary tank system.

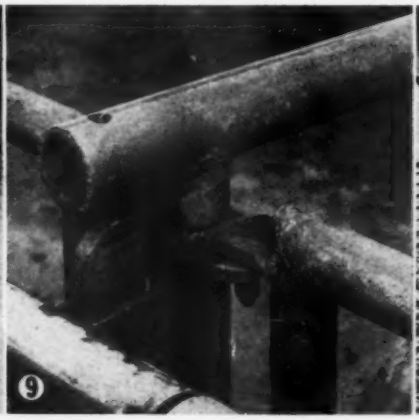
At the upper end, the double trenches nest into a shallow tank on which are unitized the shaker screens. The bottom of this basin, which contains gates for directing mud flow to either or both trenches, is tapered toward a door provided on the front side. Thus any sand which collects in the tank is readily washed out.

At the opposite end the trenches lead to a portable suction tank into which a "pill" tank has been unitized as shown in Fig. 5. Foot valves permit the pill tank to be isolated from the suction portion when desired. Water, gas, and mud-circulating lines are unitized within the tank. All are provided with quick breakout and makeup connections.

Since all lines are unitized in the trenches and suction tank, the pump end of Rocky Mountain's rigs is remarkably free of the maze of lines present at most rigs. The only piping readily visible are the suction lines from the tank to the pumps and the discharge lines. The latter, consisting of vibrator hose, lead to a manifold which is permanently mounted in the sub base (Fig. 6).

Use of flexible hose eliminates the necessity for exact lineup of mud-handling equipment, as is the case where rigid steel lines are used Also it tends to absorb pulsatives of the pump. Through use of the manifold, mud from any one pump can be directed to wherever desired in the system. And by placing it in the sub-base, another separate item of equipment is eliminated.

Other steps taken in modernizing the mud system included installation



of wedge locks on the main pump and placing steel bearing plates beneath its skid and those of other mud pumps. In addition the standpipe was unitized to the mast, and a standby unit and rotary hose provided for each rig.

Pipe-Handling Facilities

The catwalk, instead of being merely a walkway for transporting tubular goods and other equipment onto the derrick floor, is a dual-use unit. Fully enclosed, it serves as a space for storing numerous items during moves (Fig. 7); it also is the runway for four-wheel trollies (Fig. 8) used to transport pipe to the rig floor. It breaks down into two 30-ft. units. Two 15-ft. steel doors cover the front section, while wooden lids are used to cover the section nearest the ramp. Wood is used on the latter to eliminate damage to pipe threads while the pipe is being swung into the derrick. The high line is used to raise and lower all doors.

The trolley wagons run on old drill pipe used as upper members in the catwalk frame, as shown in Fig. 8. In addition to their use for moving drill pipe, the wagons are used in setting blowout preventers. The pipe ramp is hinged so that it can be raised and the wagon rolled beneath the floor. Thus it is never necessary to lift out the rotary table to install cellar equipment.

The catwalk also serves as an anchor for new-style pipe racks which break down into flat sections. They join to the catwalk at the inside end (Figs. 8 and 9) and on the outside are held upright and rigid by cross-braces. Since pin-type connections are used the racks can be quickly knocked down or set up. The individual flat sections can be compactly stacked and moved in one truck load.

Unitized pipe-racking platforms, 8 by 12 ft., are built flush with the derrick floor as shown in Fig. 10. Oak timbers placed on edge and spaced ¾ in. apart to allow for drainage, provide a working surface on which the floor crews can work safely. The platform is a single unit, with the steel supporting beams being keyed to the subbases. A collecting pan mounted beneath the timbers receives all fluids drained from the racked pipe. With drilling mud sometimes worth $30 per barrel, its recovery has been found very profitable in some instances.

So that longer strings of drill pipe can be racked in the mast, an extra landing platform is installed on all heavy-duty rigs (see Fig. 11). Still another standardized item on the rig floor is an air-powered winch. This is placed next to the driller's post and in front of the draw works as shown in Fig. 12. The air winch, which spools a ⅜-in. soft-laid steel line, does away with the catline and its attendant hazards.

Other Innovations

Three-phase generating equipment, varying from about 35 to 90 kw. in capacity rating, has been installed on nearly all Rocky Mountain rigs. And to simplify the operation of electrical equipment, a modern instrument panel with circuit breakers has been installed in the generator house of some rigs.

Recognizing the need for regular and thorough lubrication, facilities for making this possible were made as convenient as could be arranged. For example, a grease fitting placed on one mast leg makes possible lubrication of the crown block from the derrick floor. All draw works, compounding drives, engines, and pumps are equipped with "one shot" greasing systems to take the guess work out of greasing. Each engine has an external lube-oil reservoir, equipped with a sight gage glass and a metering device which automatically feeds oil into the crankcase as needed. One crewman is responsible for keeping the reservoirs filled.

Air-powered impact wrenches (Fig. 13) greatly speed up pump overhauling operations and make possible more frequent inspection of valves and seats. They also eliminate spud-bolt breakage and permit all nuts to be made up to the same degree of tightness.

Still other items or equipment on which Rocky Mountain has standardized include the use of portable canvas-covered engine houses; cellar pumps unitized on one base; and instead of placing the deadline anchor in the base where it is hard to work with, it is placed in one corner on the rig floor. Because of their convenience, chains threaded through upright pipes are used as rig railings, with rigid railings being used only on stairways.

11. Because of an extra pipe landing platform, as much as 13,500 ft. of 4½-in. drill pipe has been racked in some masts.

12. Air hoists, operated by driller at his post, does away with hazards encountered with cat lines.

13. Impact wrenches, such as this crewman is using, greatly speed up pump-overhauling jobs.

Aviation Fuels...

Here is a thorough analysis of the problem of improving their quality in event of war

by Davis Read*

THE increased demand for aviation fuels has caused the refiner to re-evaluate the methods used during the last war to produce the types of fuels required. While the very important question of how much fuel of each type will be needed in a war emergency is not fully answered, it is possible to foresee certain factors which must be considered in planning future refinery operations. This paper describes several methods of producing aviation fuels and presents some recent data illustrating the application of these methods.

Types of Aviation Fuels

During the last war grade 100/130 fuel was produced in far greater quantity than any of the other types of fuel. Of the approximately 550,000 bbl. per day peak production of all grades of aviation fuel over 450,000 bbl. per day was grade 100/130. This fuel was composed largely of catalytically cracked base stock, alkylate, and isopentane, although some naphthenic straightrun gasoline and smaller amounts of hydrogenated codimer and cumene were also required in some blends. Only a relatively small amount of 115/145 grade was produced but during the closing months of the hostilities the military requirements for this grade were increasing. Jet fuel of course was not in use by the U. S. Armed Forces during the last war.

*Universal Oil Products Co., Chicago. Paper presented before W.P.R.A., Lake Charles, La., February 23.

While large volumes of jet fuel will undoubtedly be required in an all-out war primarily for fighter planes and some types of bombers, it has been stated that there will also be a great demand for all the grades of reciprocating-engine fuel for transport, long-range bombers, and training purposes. As in the last war the greatest emphasis will probably be placed on the production of the best grades possible.

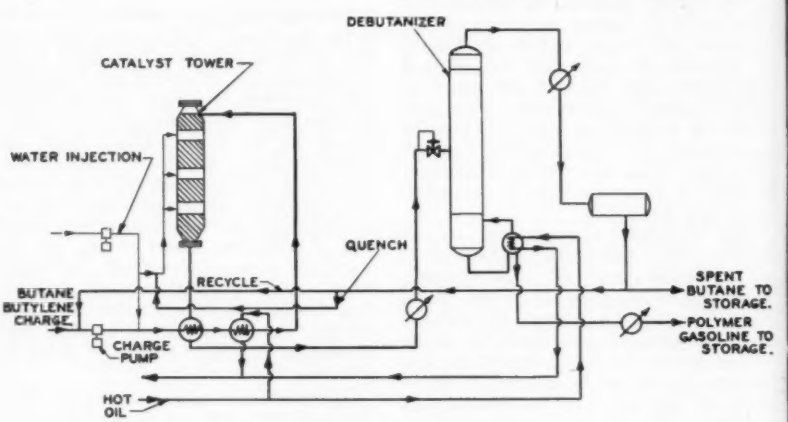


Fig. 2—U.O.P. catalytic polymerization unit, chamber type.

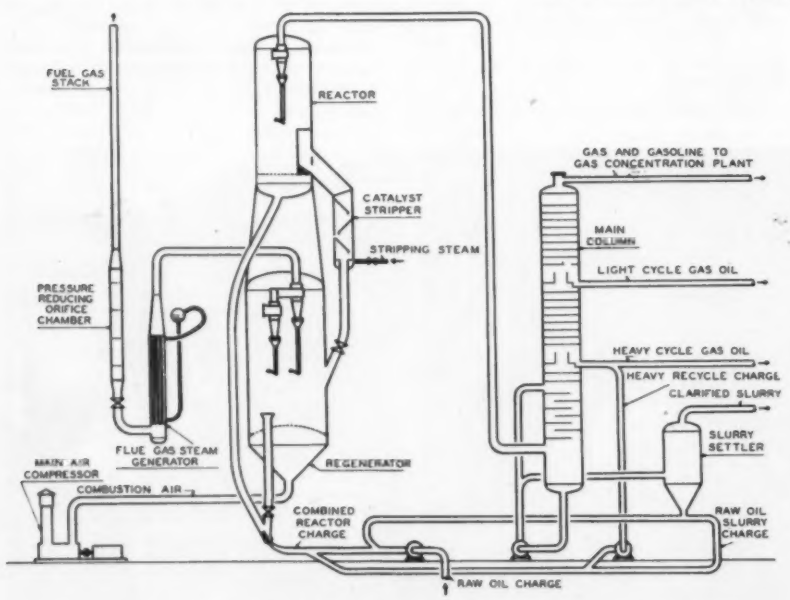


Fig. 1—U.O.P. fluid catalytic cracking unit.

In analyzing the problem of improving aviation-fuel quality it is interesting to observe that the types of hydrocarbons which are of the best quality are the isoparaffins such as isopentane and isooctane and the aromatics such as toluene, xylene, ethylbenzene, and cumene. Benzene is also high in octane rating but its use in aviation fuel is limited because of its high freezing point. The naphthenes, olefins, and straight-chain paraffins which were present as the minor components of the 100/130 grade used in the last war are of poorer quality, decreasing approximately in the order named.

Inasmuch as the jet fuels now being produced are composed primarily of fractions from the distillation of crude, the processing methods required for their production are relatively simple and well known. This paper is therefore concerned princi-

pally with the reciprocating-engine fuels and more particularly with the three higher grades of these fuels. Apparently the freezing point of —76° F. is one of the most difficult specifications to meet in manufacturing jet fuel.

A basic process required for the production of the intermediate materials needed for manufacturing reciprocating aviation fuels is that of cracking, and catalytic cracking produces greater yields of these intermediate materials than thermal cracking. Similarly, catalytic reforming can be utilized for the production of aromatics and isoparaffins much more advantageously than thermal reforming. As in the last war the polymerization process can be converted from peacetime to wartime use with little difficulty, although a somewhat different approach will probably be used. Of great importance is the alkylation process since its product is primarily

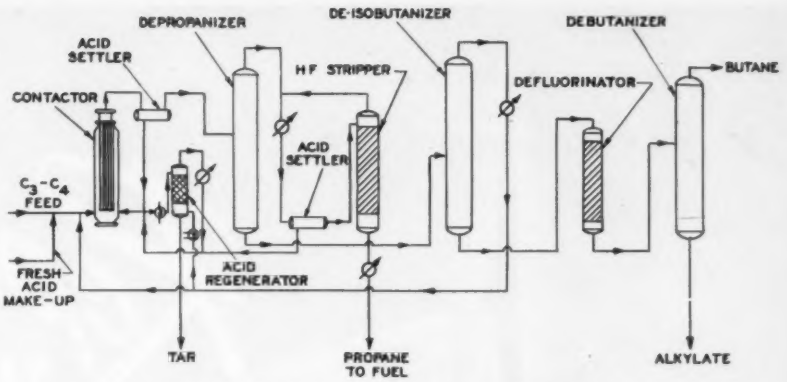


Fig. 3—U.O.P. HF alkylation process, C_3-C_4 feed.

TABLE 1—FLUID CATALYTIC CRACKING MID-CONTINENT GAS OILS OPERATING CONDITIONS AND YIELDS

Case—	1	2
Operation—	Aviation gasoline	Motor fuel
	Mid-Continent gas oil	
Charge stock—	Light	Heavy
Gravity, °A.P.I.	37.5	29.1
Characterization factor, K	11.95	11.98
Sulfur, per cent	0.4	0.39
Molecular weight	230	332
Distillation:	Atmos.	Vacuum
I.b.p., °F.	355	504
10 per cent	440	573
30 per cent	500	658
50 per cent	544	737
70 per cent	610	808
90 per cent	670	890
End point, °F.	730	923
Approximate vol. per cent of crude	35	40
Approximate position in crude, vol. per cent	30-65	48-86
Operating conditions:		
Reactor temp., °F.	926	880
Reactor pressure, psi.	8	12.5
Combined feed ratio	1.0	†1.8
Products:	—Vol. per cent—	
Methane and lighter	*1.2	*1.2
Ethylene	*0.4	*0.6
Ethane	*0.6	*1.0
Propylene	7.7	6.1
Propane	5.8	3.3
Isobutylene	2.5	1.5
n-Butylene-1	5.2	1.8
n-Butylene-2		4.4
Isobutane	11.3	7.1
n-Butane	2.2	1.9
Amylenes	2.5	4.9
Isopentane	5.7	5.9
n-Pentane	0.5	0.4
C_5-340° F., gasoline	19.6	30.8
340°-430° F. gasoline	6.0	10.0
Cycle stock	38.2	25.9

*Weight per cent. †Recycling heavy cycle stock.

TABLE 2—FLUID CATALYTIC CRACKING MID-CONTINENT GAS-OIL PROPERTIES OF PRODUCTS

Case—	1		2		
Operation and charge stock—	Aviation gasoline—Light Mid-Continent gas oil		Motor fuel—Heavy Mid-Continent gas oil		
Properties of gasolines	C_5-340° F.	340°-430° F.	C_5-430° F.	C_5-340° F.	340°-430° F.
Gravity, °A.P.I.	49.6	40.6	57.4	55.9	31.0
R.v.p., lb.	2.6	...	5.7	1.5	...
Bromine number	30	...	60	73	12
Sulfur, per cent	...	...	0.05	0.04	...
100-ml. distillation:					
I.b.p., °F.	148	344	107	160	376
5 per cent	170	350	126	178	382
10 per cent	185	356	135	186	386
30 per cent	216	360	170	203	393
50 per cent	245	365	220	228	401
70 per cent	270	370	290	264	414
90 per cent	305	476	372	305	438
End point, °F.	356	424	426	335	475
Octane ratings:					
F-1 clear	...	...	92.1	92.2	87.5
F-1 +3 cc. TEL per gallon	...	...	97.0	98.2	93.9
F-2 clear	...	...	79.0	78.0	78.1
F-2 + 3 cc. TEL per gallon	...	(80)	85.0	86.0	83.2
F-2 +4.6 cc. TEL per gallon	...	...	...	87.5	...
F-3 +4.6 cc. TEL per gallon	91.5	...	...	87.3	...
F-4 +4.6 cc. TEL per gallon	isoC$_5$ + 0.11	...	...	93.0	...
Performance numbers:					
F-3 +4.6 cc. TEL per gallon	76.7	...	...	68.8	...
F-4 +4.6 cc. TEL per gallon	104	...	...	80	...

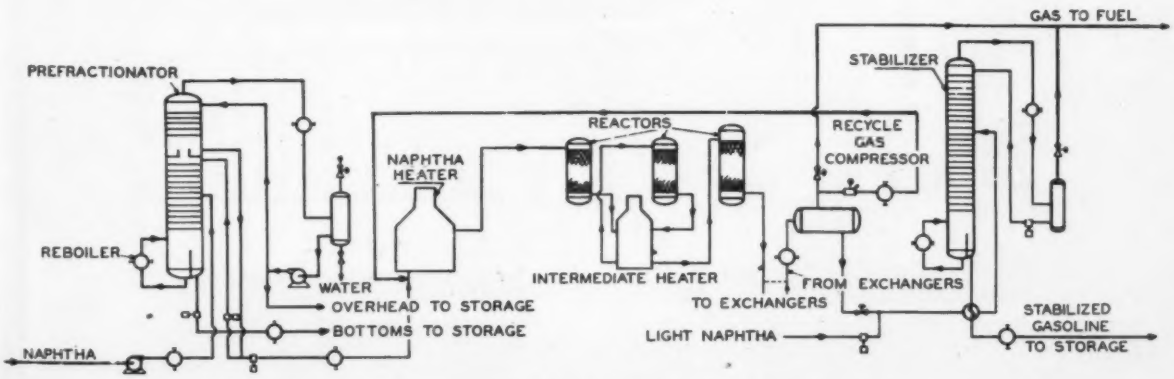
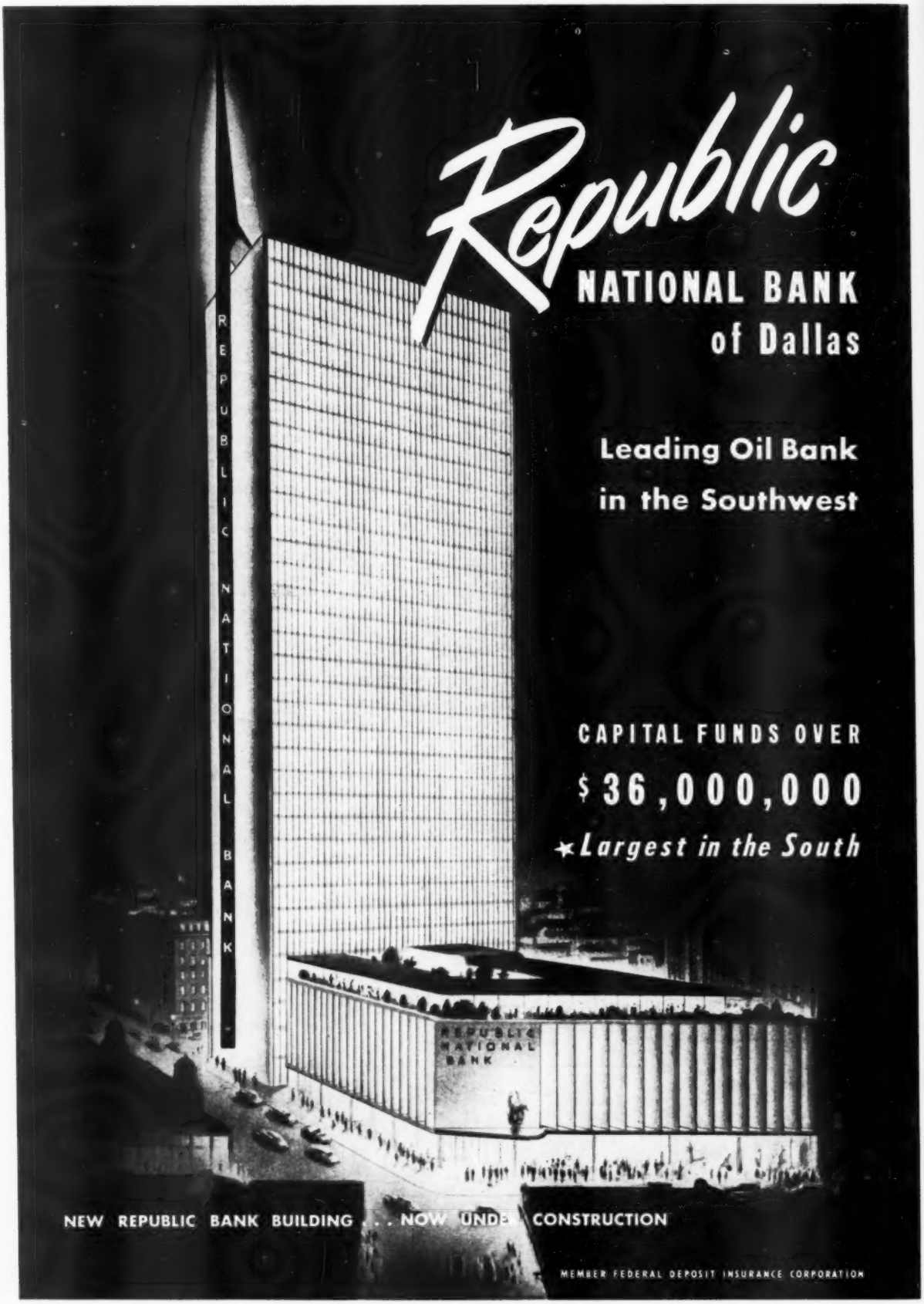


Fig. 4—Simplified flow diagram of U.O.P. Platforming unit, motor-fuel operation.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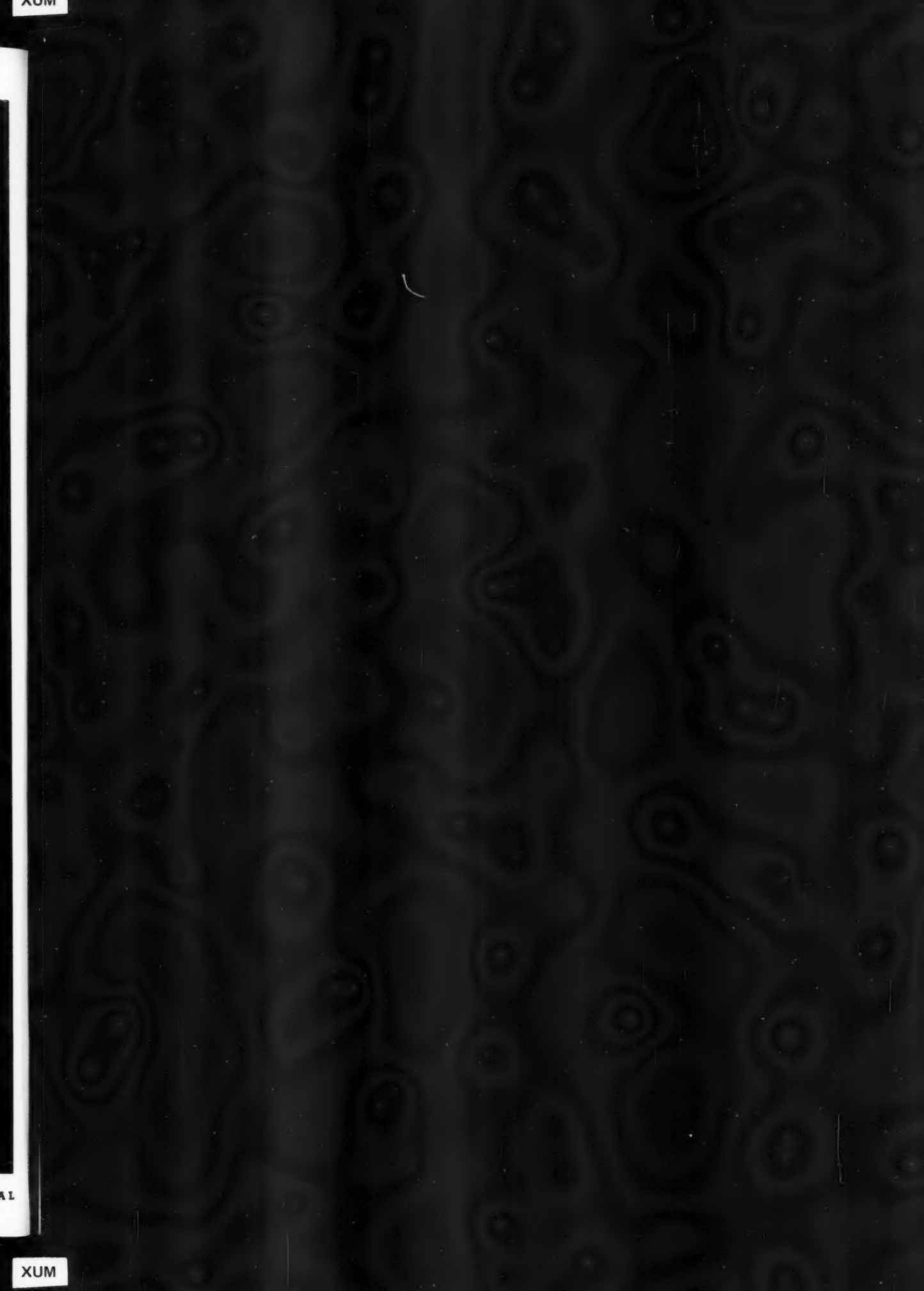

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isoparaffins boiling in the desired range. Recent developments in these processing methods are discussed in the following paragraphs.

Fluid Catalytic Cracking

Since V.-J. Day, approximately 800,000 bbl. per day of new catalytic cracking capacity of all types has been or is being installed. This does not include the replacement of existing wartime fixed and moving-bed-type catalytic cracking units with more efficient cracking sections. New fluid catalytic cracking units account for approximately 80 per cent or 640,000 bbl. per stream day of this new capacity.

Since June 1947 13 new U.O.P. designed catalytic cracking units have been placed in operation, and 12 more U.O.P. units are now being designed or are under construction. Most of these units are of the single-tower simplified design shown in Fig. 1. Those units having a fresh charge capacity above approximately 10,000 bbl. per stream day embody the same principles of design with the reactor above the regenerator, but for mechanical reasons the reactor is supported separately on these larger units.

Typical commercial yields obtained by relatively high-conversion fluid catalytic cracking of heavy Mid-Continent gas oil are given in Tables 1 and 2 under Case 2. The information given under Case 1 in these tables shows a typical fluid catalytic cracking operation on Mid-Continent gas oil during the last war. A comparison of these data will lead to the following observations regarding the utility of fluid catalytic cracking in a future war:

1. The quality of the base stock obtained by cracking the heavy gas oil would be unsuitable for inclusion even in 100/130 grade aviation gasoline without further processing. This is due principally to the fact that the heavier gas oil (29.1° A.P.I., 332 molecular weight) produces a much more olefinic product than the lighter (37.5° A.P.I., 230 molecular weight) gas oil in Case 1. In addition, the use of the wartime re-treating methods for this gasoline, such as a second pass through the cracking catalyst or acid treating, would result in low yields because of the chemical composition of this material.

2. The heavier gas oil in Case 2 produces lower yields of gases for subsequent alkylation and polymerization than the light gas oil. It should be pointed out that the type of crude from which the gas oil is obtained will, of course, have considerable effect of the cracking results. In general, an increase in the molecular weight of the gas oil from a given crude will increase the olefin content of the catalytically cracked products.

There are at least two important reasons why it is not advantageous to consider the use of the wartime light gas oils as charge stock to existing catalytic cracking units in a future emergency. The more important of these reasons is probably that the demand for motor gasoline and intermediate distillates will be such that the cracking of the heaviest gas oil, boiling just below asphalt, will be required. A second reason is that the large volume of jet and diesel fuels which will probably be required will prevent the inclusion of these light straightrun fractions in the feed stock to catalytic cracking.

From the above discussion, it appears that the catalytic cracking process can best be utilized to convert heavy gas oils to motor fuels and intermediate distillates as at present. It is also apparent that an improved method of re-treating the more olefinic gasolines produced from present catalytic cracking operations would be advantageous. In addition, the use of greater proportions of propylene and amylenes in producing alkylate than was possible in the last war would offset the lower yields of these hydrocarbons from the heavier gas oils.

TABLE 3—POLYMERIZATION YIELDS (U.O.P.)

Case—	1	2
Charge stock to catalytic cracking—	Mid-Continent gas oil: Light	Heavy
Charge stocks to polymerization, vol. per cent of charge to cat. cracking:*		
Propylene	5.8	4.5
Isobutylene	2.4	1.4
n-Butylene-1	4.9	1.7
n-Butylene-2		4.2
Yields from polymerization, vol. per cent of charge to cat. cracking:		
Propylene polymer	3.7	2.9
Isobutylene polymer	1.7	1.0
n-Butylene polymer	3.6	4.3
Total nonselective polymer	9.0	8.2
Codimer†	3.9	2.2
Isobutylene polymer	1.7	1.0

*Based on 75 per cent C_3 recovery and 95 per cent C_4 recovery in gas concentration unit. †From mixture of isobutylene and n-butylene feed.

TABLE 4—PROPERTIES OF POLYMERS

	Total nonselective polymer	Codimer	Isobutylene polymer
Gravity, °A.P.I.	67.8	62.0	63.5
R.v.p., lb.	12.1	5.5	4.3
D-86 distillation:			
I.b.p., °F.	100	116	130
10 per cent	153	190	207
30 per cent	205	218	218
50 per cent	222	226	228
70 per cent	253	240	242
90 per cent	374	348	338
End point, °F.	389	400	374
Octane ratings:			
F-1 clear	97	...	...
F-1 +3 cc. TEL per gallon	100	...	...
F-2 clear	83	*92	*95
F-3 +4.6 cc. TEL per gallon	85	$isoC_5$ + *0.5	...
F-4 +4.6 cc. TEL per gallon	...	$isoC_5$ + *3.0	...
Octane number:			
F-3 +4.6 cc. TEL per gallon	...	*104.8	...
Performance numbers:			
F-3 +4.6 cc. TEL per gallon	...	*115	
F-4 +4.6 cc. TEL per gallon	...	*147	

*After rerunning and hydrogenation.

Catalytic Polymerization

The total U.O.P. polymerization capacity now in operation amounts to approximately 51,000 bbl. per day of motor-fuel polymer in 124 units in

TABLE 5—HF ALKYLATION YIELDS (U.O.P.)

Case—	1	2
Charge stock to catalytic cracking—	Mid-Continent gas oil: Light	Heavy
Charge stocks to HF alkylation, vol. per cent of charge to catalytic cracking:*		
Propylene	5.8	4.6
Isobutylene	2.4	1.4
n-Butylene-1	5.0	1.7
n-Butylene-2		4.2
Isobutane	10.7	6.8
Amylenes	2.5	4.9
Codimer (from polymerization)	3.9	2.2
Yields from HF alkylation, vol. per cent of charge to catalytic cracking:		
Propylene alkylate:		
Depent. 330° F.e.p. alkylate	9.3	7.4
Isobutane required†	‡1.4	0.6
Butylene alkylate:		
Depent. 330° F.e.p. alkylate	11.1	11.0
Isobutane required†	‡1.8	2.0
Amylene alkylate:		
Depent. 330° F.e.p. alkylate	3.7	7.2
Isobutane required†	‡7.1	0.2
Codimer alkylate:		
Depent. 330° F.e.p. alkylate	7.5	4.2
Isobutane required†	‡5.1	‡3.6

*Based on 75 per cent C_3 recovery, 95 per cent C_4 recovery and 100 per cent C_5 recovery in gas-concentration unit. †Assuming above quantity of isobutane available in each case. ‡Excess.

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the United States and 33 units in foreign countries. During the last war, codimer was produced by polymerizing butylenes rich in isobytulene with a resulting decrease in the total fresh feed to the poly units. This product was then hydrogenated to isooctanes and blended in aviation fuel.

The yields obtainable by polymerizing propylene and butylenes in variout operations are given in Table 3 as percentages of the original catalytic cracking charge stock shown in Tables 1 and 2. Since the yields of olefins from the original cracking operations are lower when processing the heavy gas oil in Case 2, the polymer yields are also lower in this case.

The properties of nonselective or motor-fuel polymer and typical codimer and isobutylene polymers are shown in Table 4. It will be noted that an average codimer F-2 clear octane rating of 92 with an F-3 leaded performance number of 115 is obtained after rerunning and hydrogenation. An F-4 leaded performance number of 147 can be obtained after hydrogenation of this material. The isobutylene polymer has an F-2 clear octane rating of 95 after rerunning and hydrogenation.

Since the F-3 performance number obtained by hydrogenation of butylene polymers is somewhat lower than can be obtained by alkylating these polymers, it is probable that they will be alkylated in a future war emergency. Another advantage for alkylation is the fact that more of the normal butylenes can be included in the feed to the polymerization step if the polymer is to be alkylated rather than hydrogenated. The demand for isobutylene for synthetic rubber manufature increases the importance of this latter advantage for alkylation.

A simplified flow diagram of a chamber type polymerization unit for C_4 feed only is given in Fig. 2. This type of operation would be suitable for codimer or isobutylene polymer production. The major items of equipment consist of a fired or hot oil preheater, the reactor or catalyst tower and a debutanizer. The amount of recycle depends on the olefin content of the feed with provision for the use of recycle as quench in various sections of the tower.

HF Alkylation

At the present time, seven U.O.P. HF alkylation units are in operation and three additional wartime units are being revamped for startup. The yields which can be obtained by alkylating propylene, butylene, amylenes, and codimer are given in Table 5 as volume per cent of the original catalytic cracking charge stock listed in Table 1. The yields from the individual hydrocarbons are listed separately in this table, together with the isobutane required. It is assumed in these calculations that all of the isobutane produced and recovered from the catalytic cracking operations will be available. It is interesting to note that there is an excess production of isobutane when alkylating with each of the olefin streams separately in Case 1. When cracking the heavy gas oil in Case 2, however, insufficient isobutane is produced to combine with all of any one of the olefin streams produced, with the exception of the alkylation of codimer.

TABLE 6—PROPERTIES OF HF ALKYLATES

Properties of rerun alkylates:	Butylene alkylate	Propylene-butylene alkylate	Propylene-butylene-amylene alkylate	Isobutylene polymer alkylate
Gravity, °A.P.I.	72.8	74.0	70.2	70.2
R.v.p., lb.	...	8.6	2.0	2.8
D-86 distillation:				
I.b.p., °F.	...	94	139	...
5 per cent	...	120	161	...
10 per cent	136	138	181	190
30 per cent	185	185	196	205
50 per cent	212	215	204	218
70 per cent	228	227	219	227
90 per cent	239	237	239	237
End point, °F.	309	314	327	320
Octane ratings:				
F-3 +4.6 cc. TEL per gallon	$isoC_8$+1.15	$isoC_8$+0.56	$isoC_8$+0.79	$isoC_8$+1.40
F-4 +4.6 cc. TEL per gallon	$isoC_8$+3.2	$isoC_8$+2.2	$isoC_8$+2.4	$isoC_8$+2.90
Octane number:				
F-3 +4.6 cc. TEL per gallon	108.0	105.2	106.4	108.7
Performance numbers:				
F-3 +4.6 cc. TEL per gallon	128	117	122	132
F-4 +4.6 cc. TEL per gallon	148	140	142	146

The properties of typical rerun alkylates are given in Table 6. It is apparent that both butylene alkylate and isobutylene polymer alkylate are superior in quality to the propylene-butylene alkylate and the propylene-butylene-amylene alkylates. It is also evident from these data that while all of these alkylates exceed the F-3 performance numbers required for the production of 115/145 grade aviation fuel, the alkylates produced from feeds containing propylene and amylene are somewhat short of the required F-4 performance number.

A simplified flow diagram of an HF alkylation unit for C_3-C_4 feed is shown in Fig. 3. This process is carried out essentially as follows: The fresh feed, dried by fractionation or by means of a desiccant, flows to the reactor where intimate mixing with the acid catalyst and recycle isobutane is provided under sufficient

TABLE 7—PLATFORMING VARIOUS STRAIGHTRUN AND RECYCLE DISTILLATE NAPHTHAS FOR AVIATION FUELS PROPERTIES OF CHARGE AND PER CENT YIELDS

Test No.—	1	2	3	4	5
Charge stock to reactors source—	Coastal strun.	Coastal strun.	Redwater strun.	Coastal recycle dist.	E. Texas strun.
Vol. per cent of original straightrun	...	23.5	80.9	...	...
Vol. per cent of crude or recycle distillate	*5	6	26	41.4	20.0
Gravity, °A.P.I.	57.4	60.0	54.3	65.1	57.3
Composition, vol. per cent:					
Paraffins	31	†37	41	56	43
Naphthenes	61	†57	52	39	51
Aromatics	8	†6	7	5	6
Total	100	100	100	100	100
D-86 distillation:					
I.b.p., °F.	203	188	186	156	193
10 per cent	206	193	212	171	208
50 per cent	208	197	268	182	236
70 per cent	209	200	312	192	259
90 per cent	212	206	362	208	296
End point, °F.	220	213	402	236	334
Octane ratings:					
F-1 clear	...	67.3	51.5	...	57.9
F-1 +3 cc. TEL per gallon	..	83.6	68.2	...	77.6
Yields per cent of charge to reactors:					
Hydrogen, wt. per cent	2.4	2.6	1.6	2.0	1.9
Methane, wt. per cent	0.4	0.2	0.6	0.5	1.5
Ethane, wt. per cent	1.7	0.8	1.4	1.6	1.2
Propane, wt. per cent	4.2	1.9	3.0	3.3	2.8
Isobutane, wt. per cent	2.4	1.8	1.5	3.1	1.4
n-Butane, wt. per cent	1.5	1.1	2.3	2.3	1.9
Isopentane, wt. per cent	1.2	1.5	2.3	2.1	2.9
n-Pentane, wt. per cent		0.5	1.1		2.2
Light Platformate, vol. per cent	28.0	§56.0	§61.9	59.5	‡79.3
Heavy Platformate, vol. per cent	51.3	28.0	20.9	20.7	1.4

*Approximate. †Weight per cent. ‡84.0 volume per cent including pentanes and 79.3 volume per cent depentanized. §Depentanized.

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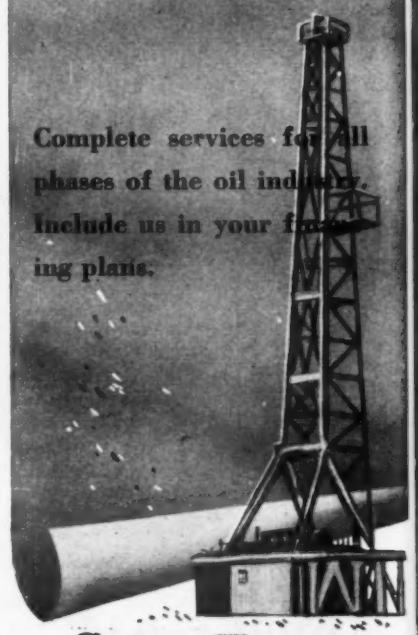

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TABLE 8—PLATFORMING VARIOUS STRAIGHTRUN AND RECYCLE DISTILLATE NAPHTHAS FOR AVIATION FUELS PROPERTIES OF PRODUCTS

Test No.—	1	2	3	4	5
Charge stock source—	Coastal strun.	Coastal strun.	Redwater strun.	Coastal recycle dist.	E. Texas strun.
Boiling range, °F.	203-220	188-213	186-402	156-236	195-336
Light Platformate:					
Gravity, °A.P.I.	§63.7	59.8	54.1	§64.8	§50.0
R.v.p., lb.	...	2.1	2.4	6.1	3.0
D-86 distillation:					
I.b.p., °F.	114	171	160	140	147
10 per cent	150	177	188	150	184
50 per cent	195	185	223	159	230
70 per cent	203	191	246	167	259
90 per cent	214	200	274	182	302
End point, °F.	225	211	300	209	337
Octane ratings:					
F-1 clear	...	...	...	...	89.6
F-1 +3 cc. TEL per gallon	...	...	...	...	98.2
F-3 +4.6 cc. TEL per gallon	...	88.8	*92.4	†98.0	‡98.0
F-4 +4.6 cc. TEL per gallon	...	96.5	$isoC_8$+*0.15	$isoC_8$+†1.25	$isoC_8$+‡1.1
Benzene content, vol. per cent	2.6	13.8	...	19.6	...
Toluene content, vol. per cent	23.1	9.0	...	2.2	...
Heavy Platformate:					
Gravity, °A.P.I.	32.9	32.0	30.9	32.7	23.2
D-86 distillation:					
I.b.p., °F.	227	226	306	228	...
10 per cent	231	230	314	234	...
50 per cent	236	232	350	238	...
70 per cent	242	234	360	243	...
90 per cent	263	241	392	264	...
End point, °F.	354	314	380	350	...
Octane ratings:					
F-3 +4.6 cc. TEL per gallon	$isoC_8$+0.20	$isoC_8$+0.53	...	...	...
F-4 +4.6 cc. TEL per gallon	>+6	>+6	...	...	...
F-1 clear	...	...	99.8	...	...
F-1 +3 cc. TEL per gallon	...	...	$isoC_8$+0.15	...	...
Toluene content, vol. per cent	81.0	92.3	...	82.0	...
Xylenes and ethyl benzene, vol. per cent	13.0	5.4	...	15.0	...

*Calculated to include pentanes produced and scaled from 4.0 cc. TEL per gallon data. †Obtained on a blend of proportionate parts of light and heavy Platformate + 15 per cent isopentane. ‡Determined on blend of 78 per cent debut. light Platformate and 22 per cent isopentane (7.1-lb. R.v.p. blend). §Including a portion of the pentanes produced.

pressure to keep the mixture in the liquid state. The reactor effluent, consisting of unreacted light hydrocarbons, alkylate, and acid, is permitted to separate into hydrocarbon and acid phases. Substantially complete separation is obtained by settling and the settled acid is recycled to the reactor. The hydrocarbon phase will contain some dissolved acid which is removed by fractionation. The dissolved hydrofluoric acid is recovered as an overhead product in fractionation and is returned to the reaction system.

Some heavy polymers are formed in the alkylation reaction but the catalyst has the advantage that it can be regenerated. The heavy polymers may be removed from the hydrofluoric acid by fractionation and stripping, which continuously returns a purified acid to the reaction zone. There is, therefore, no acid-disposal problem.

After removal of the dissolved acid, the hydrocarbon stream is further fractionated to separate the unreacted hydrocarbons, an isobutane recycle stream and alkylate. A rerun tower may be provided to separate the light and heavy alkylates, depending upon the end point and quality of alkylate required.

TABLE 9—PLATFORMING FLUID CATALYTIC CRACKED FIRST PASS C_5-340° F. CUT FROM MOTOR FUEL OPERATION

Yields, per cent of charge:	
Gas C_4 and lighter, wt. per cent	7
Debut. Platformate, vol. per cent	92

Properties of charge and products:	Charge stock	Debut. Platformate	Blend stab. Plat. + 20% isopentane
Gravity, °A.P.I.	55.9	54.4	60.7
R.v.p., lb.	1.5	3.7	6.4
Bromine number	73	1	...
Sulfur, per cent	0.04	<0.01	...
100-ml. distillation:			
I.b.p., °F.	160	140	114
5 per cent	178	160	130
10 per cent	186	169	138
30 per cent	203	189	164
50 per cent	228	219	197
70 per cent	264	263	248
90 per cent	305	310	308
End point, °F.	335	353	348
Octane ratings:			
F-1 clear	92.2	86.2	...
F-1 +3 cc. TEL per gallon	98.2	96.3	...
F-2 clear	78.0	...	...
F-2 +3 cc. TEL per gallon	86.0	...	...
F-2 +4.6 cc. TEL per gallon	87.5	89.8	...
F-3 +4.6 cc. TEL per gallon	87.3	...	98.6
F-4 +4.6 cc. TEL per gallon	93.0	...	$isoC_8$+0.3

TABLE 10—AVIATION-GASOLINE BLENDING GRADE 91/96

Source of base stock—	Platforming Redwater straightrun naphtha
Reference table numbers	9 & 10
Test No.	3
Blend composition, vol. per cent:	
Light Platformate (debutanized)	85.3
Isopentane (90 per cent)	14.7
Total	100.0
Properties of blend:	
Gravity, °A.P.I.	59.5
R.v.p., lb.	7.0
A.S.T.M. gum, mg.	0
Octane ratings:	
F-3 clear	77.5
F-3 +2.5 cc. TEL per gallon	*91.0
F-3 +4.0 cc. TEL per gallon	94.1
F-3 +4.6 cc. TEL per gallon	*95.3
F-4 +2.5 cc. TEL per gallon	*96.8
F-4 +4.0 cc. TEL per gallon	99.6
F-4 +4.6 cc. TEL per gallon	*100.0
D-86 distillation:	
I.b.p., °F.	116
10 per cent	145
30 per cent	175
50 per cent	212
70 per cent	240
90 per cent	271
End point, °F.	305

*Estimated from values at other lead levels.

Platforming Process

In the previous paragraphs it has been shown that alkylate, which is the major component of the higher grades of aviation fuel, usually has an F-3 lean rating in excess of that required for 115/145 fuel and that it is usually somewhat low in F-4 rich rating, particularly when produced from feed stocks containing propylene and amylenes. At the present time, several refiners manufacturing 115/145 fuel are forced to exceed the F-3 lean specification in order to produce the required F-4 rating. This accounts in part for the recent tremendous increase in the demand for all aromatics, most of which have exceedingly high F-4 ratings.

The U.O.P. Platforming process has been found to be ideally suited for the production of the desired aromatics from straightrun and natural-gasoline fractions. Since the start of operation of the first Platforming unit 1½ years ago at Muskegon, Mich.,

TABLE 11—AVIATION-GASOLINE BLENDING GRADE 100/130

Source of base stock—			Platforming coastal straightrun (188°-213° F.)
Reference table numbers			9 & 10
Test No.			2
Blend composition, vol. per cent:			
Alkylate base*			63.4
Blend of light and heavy Platformate†			36.6
Total			100.0
Properties of blend and components:	Alkylate base	Total Platformate	Aviation blend
Gravity, °A.P.I.	75.2	50.8	64.8
R.v.p., lb.	7.8	1.8	3.9
Octane ratings:			
F-3 clear	...	75.3	...
F-3 +3 cc. TEL per gallon	...	92.0	...
F-3 +4.6 cc. TEL per gallon	isoC$_8$+0.55	94.0	isoC$_8$+0.13
F-4 +4.6 cc. TEL per gallon	isoC$_8$+2.3	...	isoC$_8$+1.8
Octane number:			
F-3 +4.6 cc. TEL per gallon	105.2	94.0	101.7
Performance numbers:			
F-3 +4.6 cc. TEL per gallon	117	82.4	105
F-4 +4.6 cc. TEL per gallon	141	...	136
D-86 distillation:			
I.b.p., °F.	106	120	115
10 per cent	134	189	153
30 per cent	161	194	180
50 per cent	193	200	198
70 per cent	212	208	210
90 per cent	243	223	232
End point, °F.	327	258	327

*Alkylate base composition is 51 per cent C_5 alkylate, 34 per cent C_4 alkylate, and 15 per cent isopentane. †Blend of light and heavy Platformates in the proportions produced in test No. 2 (see Tables 9 and 10).

by Old Dutch Refining Co., 13 additional units have been licensed and are now in the design or construction stages.

A simplified flow diagram of a Platforming unit is given in Fig. 4 and shows the prefractionator, heaters, reactors, and stabilizer arranged for normal operation to produce motor fuel. The methods of feed preparation and the number of reactors and interheaters required will vary, depending upon the type of stock used when producing highly aromatic Platformate.

Recent results obtained in both pilot plant and commercial Platforming operations are given in Tables 7, 8, and 9. The yields and properties of products obtained from various straightrun and recycle distillate naphthas are given in the first two of these tables. In Tests 1 and 2, relatively narrow boiling cuts from coastal straightrun gasoline distilling in the 190°-220° F. range by the D-86 test method were processed for the production of toluene concentrates. Since the first stock contained a higher concentration of naphthenes which produce toluene, the yield of toluene concentrate was considerably higher in this test. The quality of the toluene concentrate was somewhat better in the second test; however, both concentrates rated better than isooctane plus 6 by the F-4 rating with 4.6 cc. TEL per gallon and contained approximately 95 per cent aromatics.

In the third test listed in Tables 7 and 8, a 180°-400° F. straightrun naphtha from Redwater Canadian crude was processed to yield 61.9 per cent of light Platformate having F-3 and F-4 ratings of 92.4 and isooctane plus 0.15, respectively, each with the addition of 4.6 cc. TEL per gallon. The heavy Platformate representing 20.9 per cent of the charge stock had an F-1 unleaded rating of 99.8.

The fourth test listed in Tables 7 and 8 show the results obtained by processing a 156°-236° F. naphtha which represented 41.4 per cent of a coastal recycle distillate. In this case, the total yield of light and heavy Platformate amounted to 80.2 per cent of the charge stock. The total Platformate when blended with 15 per cent of technical isopentane had F-3 and F-4 ratings of 98 and isooctane plus 1.25, respectively, with 4.6 cc. TEL per gallon.

In the last test given in Tables 7 and 8, a 190°-334° F. naphtha produced in the commercial distillation of East Texas crude was platformed to produce a yield of 84.0 per cent by volume of debutanized light Platformate. When this material was blended with 22 per cent of technical isopentane to bring its vapor pressure to 7 lb. the F-3 and F-4 octane ratings on the blend were 98.0 and isooctane plus 1.1, respectively, with 4.6 cc. TEL per gallon. It is estimated that only 17 per cent butylene alkylate would be required to bring this blend to 100/130 grade aviation-gasoline specifications.

From the above data, it is apparent that the Platforming process can be effectively utilized to relieve the present shortage and meet the increasing demand for aromatics for aviation fuels. In addition, some straightrun naphthas, which are available from two of the largest oil-producing fields, can be upgraded for use as base stocks to produce 100/130 aviation grade gasoline. Since the Platformates from these straightrun naphthas are low in gum and sulfur and have high

TABLE 12—AVIATION-GASOLINE BLENDING GRADE 115/145

Source of base stock—				Platforming coastal straightrun (188°-213° F.)
Reference table numbers				9 & 10
Test No.				2
Blend No.:			1	2
Alkylate base*			83.6	90.7
Heavy Platformate			16.4	9.3
Total			100.0	100.0
Properties of blends and components:	Alkylate base*	Heavy Platformate	Aviation blend	
Gravity, °A.P.I.	75.2	32.0	66.6	70.2
R.v.p., lb.	7.8	...	5.8	6.0
Octane ratings:				
F-3 +4.6 cc. TEL per gallon (isoC$_8$+)	+0.55	+0.53	+0.47	+0.53
F-4 +6.4 cc. TEL per gallon (isoC$_8$+)	+2.3	>+6	+5.2	+3.2
Octane number:				
F-3 +4.6 cc. TEL per gallon	105.2	105	104.6	105
Performance numbers:				
F-3 +4.6 cc. TEL per gallon	117	117	115	117
F-4 +4.6 cc. TEL per gallon	141	...	158	148
D-86 distillation:				
I.b.p., °F.	106	226	106	106
10 per cent	134	230	143	141
30 per cent	161	231	176	173
50 per cent	193	232	204	202
70 per cent	212	234	217	216
90 per cent	243	241	238	242
End point, °F.	327	314	328	327

*Alkylate base composition is 51 per cent C_5 alkylate, 34 per cent C_4 alkylate, and 15 per cent isopentane.

TABLE 13—BLENDING BUTYLENE ALKYLATE AND HEAVY PLATFORMATE

Source of base stock—			Platforming coastal strun.					
Reference table numbers			9 & 10					
Test No.			1					
Blend No.—			1	2	3	4	5	6
Blend composition, vol. per cent:								
Butylene alkylate			95	90	80	70	50	25
Heavy Platformate			5	10	20	30	50	75
Total			100	100	100	100	100	100
Properties of blends and components—	Butylene alkylate	Heavy Platformate	1	2	3	4	5	6
Octane ratings:								
F-3 +4.6 cc. TEL per gal. (isoC$_8$+)	+1.9	+0.15	+1.8	+1.5	+0.8	+0.9	+0.13	+0.07
F-4 +4.6 cc. TEL per gal. (isoC$_8$+)	+3.6	>+6	+3.8	+4.5	>+6	>+6	>+6	>+6
Octane number:								
F-3 +4.6 cc. TEL per gal.	110.0	101.9	109.7	109.0	106.5	107.0	101.7	101.0
Performance numbers:								
F-3 +4.6 cc. TEL per gal.	137	105	135	132	127	121	109	102
F-4 +4.6 cc. TEL per gal.	150	...	151	155	172	193	229	...
Blending performance Nos. of Platformate:*								
F-3 +4.6 cc. TEL per gal.	...	...	97	87	87	84	83	90
F-4 +4.6 cc. TEL per gal.	...	...	173	197	257	294	308	...

*Assuming alkylate blends at its actual performance number.

induction periods, they are stable in storage.

In the preceding discussion of the catalytic cracking, it was stated that the C$_8$-340° F. fraction of the gasoline produced from fluid catalytic cracking when operated under motor-fuel conditions would normally require additional processing to improve its quality for use as aviation-gasoline base stock. Accordingly, a sample of this fraction produced in cracking heavy Mid-Continent gas oil under the conditions of Test 2 in Table 1 was processed in a Platforming pilot plant as shown on Table 9. The yield of debutanized Platformate obtained in this test was 92 per cent of the charge stock and a blend of debutanized Platformate and 20 per cent technical isopentane was rated at 98.6 and isooctane plus 0.3 by the F-3 and F-4 methods, respectively with 4.6 cc. TEL per gallon. It is estimated that 55 per cent of butylene alkylate would be required to produce a blend having an F-4 performance number of 130 with 4.6 cc. TEL per gallon. The calculated F-3 performance number of this blend would be 112.

Aviation-Gasoline Blending

Examples of actual laboratory blends for the three grades of aviation gasoline produced with Platformate, alkylate, and isopentane are given in Tables 10-12.

As an illustration of the production of grade 91/96 aviation gasoline, the data given in Table 10 shows that a blend of 85.3 per cent of debutanized light Platformate produced in Platforming Redwater straightrun naphtha (Table 8, Test 3) and 14.7 per cent of technical isopentane has F-3 and F-4 octane ratings of 91 and 96, respectively, with only 2.5 cc. TEL per gallon.

As shown in Table 11, a blend containing 63.4 per cent alkylate base and 36.6 per cent total Platformate from coastal straightrun (Table 8, Test 2) will exceed the 100/130 octane specifications. Similarly, a blend of alkylate base and Platformate containing only 9.3 per cent of the heavy Platformate from coastal straightrun (Table 10, Test 2) exceeded the 115/145 aviation octane specifications as shown in Table 12. It should be noted that alkylate produced from propylene and butylene was used in these blends. The production of this highly aromatic Platformate will thus permit the use of the lower-grade alkylates produced from propylene and amylenes and thereby greatly increase the potential feed stocks for alkylation.

Additional data on the blending of heavy Platformate with alkylate are given in Table 13. These blends were made using heavy Platformate from Platforming coastal straightrun naphtha (Table 7, Test 1) and high-quality butylene alkylate. The blending performance number of the Platformate was calculated assuming that the alkylate blends arithmetically at its actual performance number. On this basis, it is shown that the F-4 blending performance number increases from 173 in 5 per cent concentration to 308 at 50 per cent concentration. The F-4 rating of a blend of 75 per cent heavy Platformate was too high for determination. It is interesting to note that a fuel having F-3 and F-4 performance numbers of 127 and 172, respectively, with 4.6 cc. TEL per gallon can be produced by blending 20 per cent of Platformate with the alkylate as shown under Blend 3.

Conclusions

The following conclusions may be reached from a study of the data included in this paper:

1. The existing catalytic cracking units can be utilized more advantageously to process heavy gas oils rather than the light stocks which were charged to this process during the last war. This is due primarily to the probable demand for large volumes of jet and diesel fuels, both of which would be reduced in supply by the catalytic cracking of light rather than heavy gas oils.

2. A high yield of stable base stock for aviation gasoline blending can be produced by re-treating the highly olefinic catalytically cracked gasoline from heavy gas oil over the Platforming catalyst.

3. The Platforming process can be effectively utilized to relieve the present shortage of aromatics, meet the rapidly increasing demand for these materials, and increase the potential supply of aviation fuels.

4. By increasing the production of aromatics with Platforming naphthas from straightrun and natural gasolines, it is possible to reduce the quality of the alkylate required to meet 115/145 grade specifications. This will permit the utilization of propylene and amylenes and catalytic butylene polymers as well as butylenes as feed stocks to alkylation units.

5. Some straightrun naphthas available from conventional commercial crude-distillation units can be platformed to produce high yields of an excellent base stock for 100/130 grade aviation gasoline.

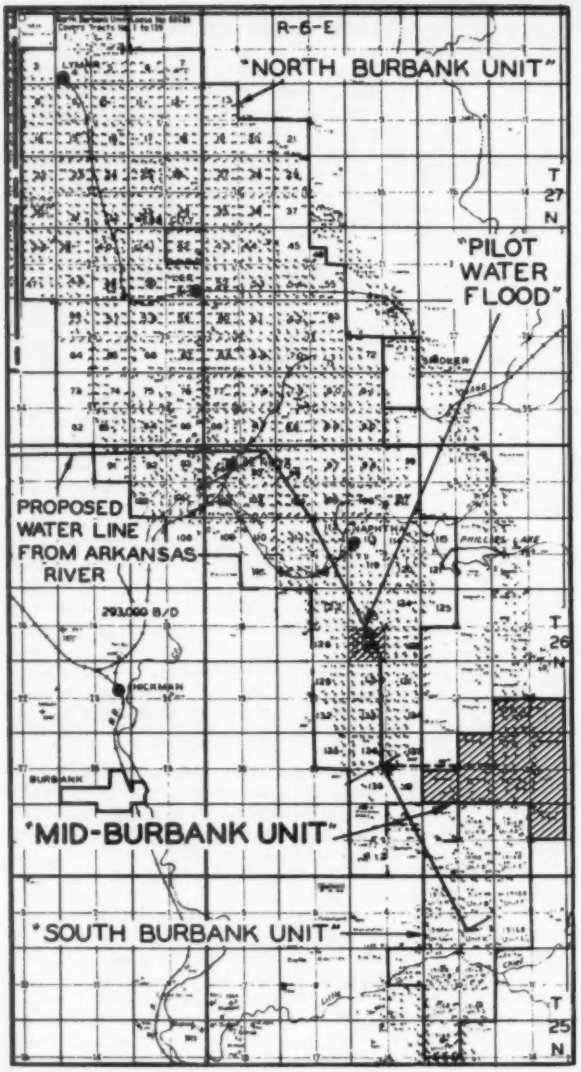
6. Most straightrun naphthas can be platformed to produce 91/96 grade and 80 grade aviation gasolines. The low gum and high induction period of the saturated Platformate should make it exceedingly stable in storage, which is an important factor in military use.

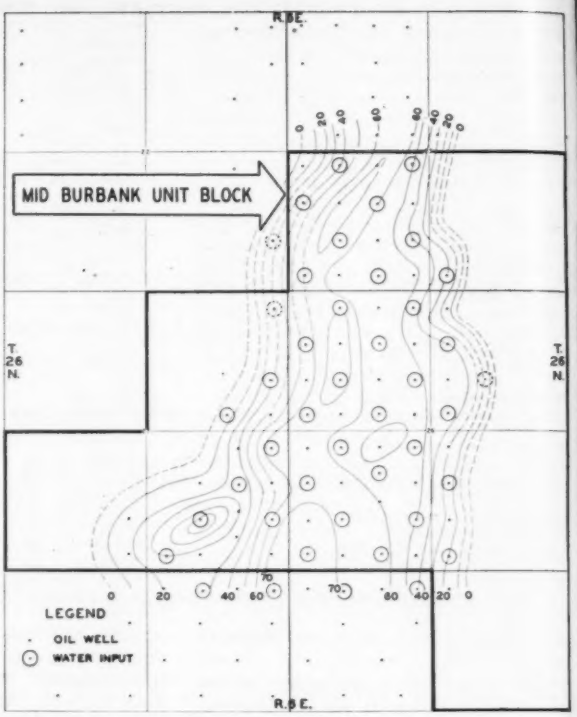
Kansas Production Sold

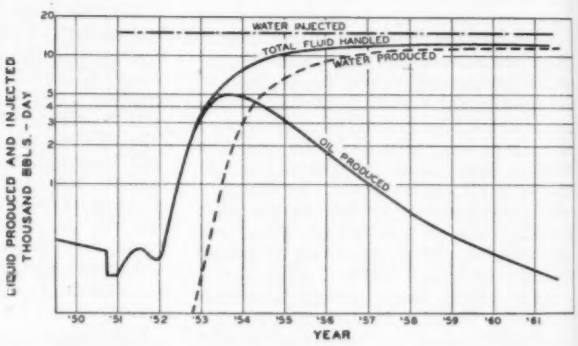
WICHITA. — Emmett Pratt, Tulsa, has purchased an interest in 33 proing oil wells in Kansas from Birmingham-Bartlett Drilling Co. of Wichita for a sum in excess of $1,000,000.

The wells are located on 12 leases in Rooks, Rice, Barton, Stafford, Russell, and Pawnee counties. They produce a total of 800 bbl. of oil per day, which represents about two-thirds of the Wichita firm's current production. Physical transfer of the properties was effective March 1, with production credited to Pratt as of February 1.

Birmingham-Bartlett, a partnership, was formed early in 1948 and operates as both a drilling-contracting firm and a production company. Partners are E. L. Birmingham, Jr., Richard Hindery, and W. N. Bartlett. The company will continue to operate in Kansas.







ORDERLY WATER-FLOOD PROGRAM

for Mid-Burbank Unit, Osage County, Oklahoma

by Kenneth B. Barnes

"Secondary" oil recovery from this new water-flood project, lying between the big North and South Burbank units, may equal its past "primary" production

PLANS are now formulated for the systematic water flooding of the Mid-Burbank unitized area, which lies at the extreme north end of South Burbank field, Osage County, Oklahoma. The Mid-Burbank unit contains 862 productive acres and 49 producing wells.

Preparatory to the definite decision to proceed with water-drive operation, the Mid-Burbank properties were unitized by the four companies involved. Official starting date for the unitized operation was January 1, 1951. Participants in the unit are Kewanee Oil Co. (unit operator), Skelly Oil Co., The Texas Co., and Gulf Oil Corp.

The Mid-Burbank unitization followed by 12 months the unitization of the much larger North Burbank pool to the north, where such operation commenced November 14, 1949. The North Burbank unit already has a pilot-type water-flood operation under way on the 160 acres comprising the SW¼ 16-26n-6e. Here there are 16 producing oil wells and 9 injection wells. First water input was on February 14, 1950, when the 160 acres were producing 30 bbl. per day. Oil increase from the pilot water flood has been extremely satisfactory, the present rate being about 950 bbl. per day, and still increasing. The Mid-Burbank unit participants believe that

the Burbank sand conditions for their properties are of somewhat the same order as North Burbank and that they, too, should secure very good results by water-drive operation.

Also of interest are the present studies for water flood by the companies owning properties in the South Burbank unit, immediately south of the Mid-Burbank unit. South Burbank was unitized in 1935, shortly after its discovery—in contrast with the much later unitization of the North Burbank and Mid-Burbank areas.

All three of the Burbank areas have been under gas-repressuring operation for a number of years, with good results. Studies of the thickness and character of the Burbank sand, core analyses, and the gas-expansion producing mechanism, however, have indicated that considerable additional oil recovery could be obtained by water flooding.

History of Original Development

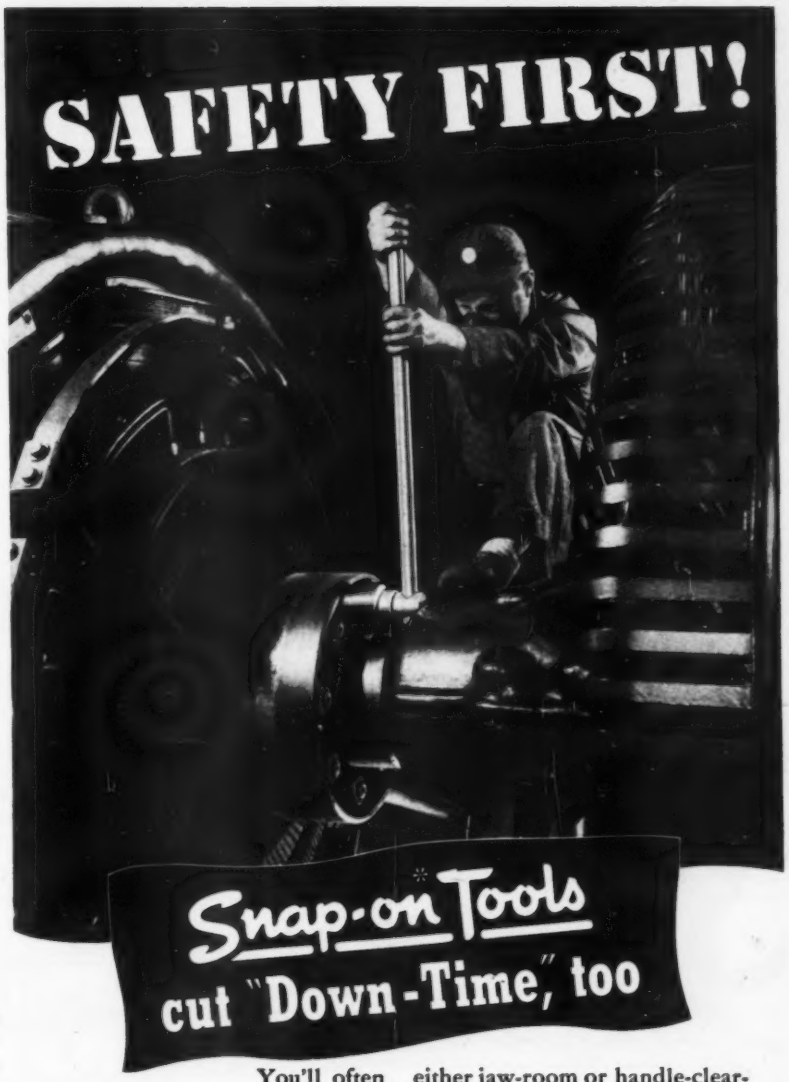
The Mid-Burbank unit comprises a portion of a long narrow producing reservoir, paralleling the main Burbank field, and about 1 mile removed from its eastern edge. The several pools, as shown in Fig. 1, produce from the Burbank sand lying at an approximate depth of 2,900 ft.

The first producer in the Mid-Burbank unit was Phillips Petroleum Co. 1 Sanson (now Skelly Oil Co.) which was completed as a small pumper in 1934. Subsequently it was disclosed that this well was on the extreme west edge of the main sand body. Actually, discovery and concerted development of the unit followed a series of successful well completions in the area now designated as the South Burbank unit.

Well completions.—The wells in the Mid-Burbank unit were drilled from surface to total depth by cable tools, utilizing a short string of either 8⅝ or 10¾-in. surface pipe to prevent surface-water contamination. In the majority of instances the 7-in. oil string was cemented at the top of the sand with 50 to 100 sacks and the remaining pay section penetrated in a reduced hole. The wells were then tamped shot with 50 to 150 qt. of nitroglycerin if natural flowing conditions did not prohibit the shot placement.

Past production.—The properties in the Mid-Burbank area have had a creditable primary producing life. From a planimetered productive area of 862 acres with a calculated sand volume of 31,430 acre-ft., the unit area had recovered 5,788,130 bbl. to July 1, 1950. The oil volume represents a recovery of 6,715 bbl. per acre or 184 bbl. per acre-foot.

Due to the commencement of gas repressuring early in the producing period of the properties, the attributable benefits cannot be readily reconciled from decline curves. However, it can be substantiated by com-



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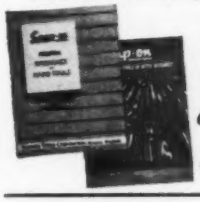

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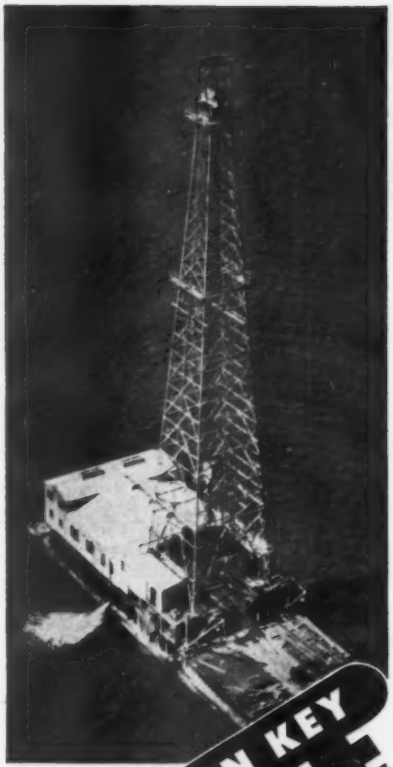

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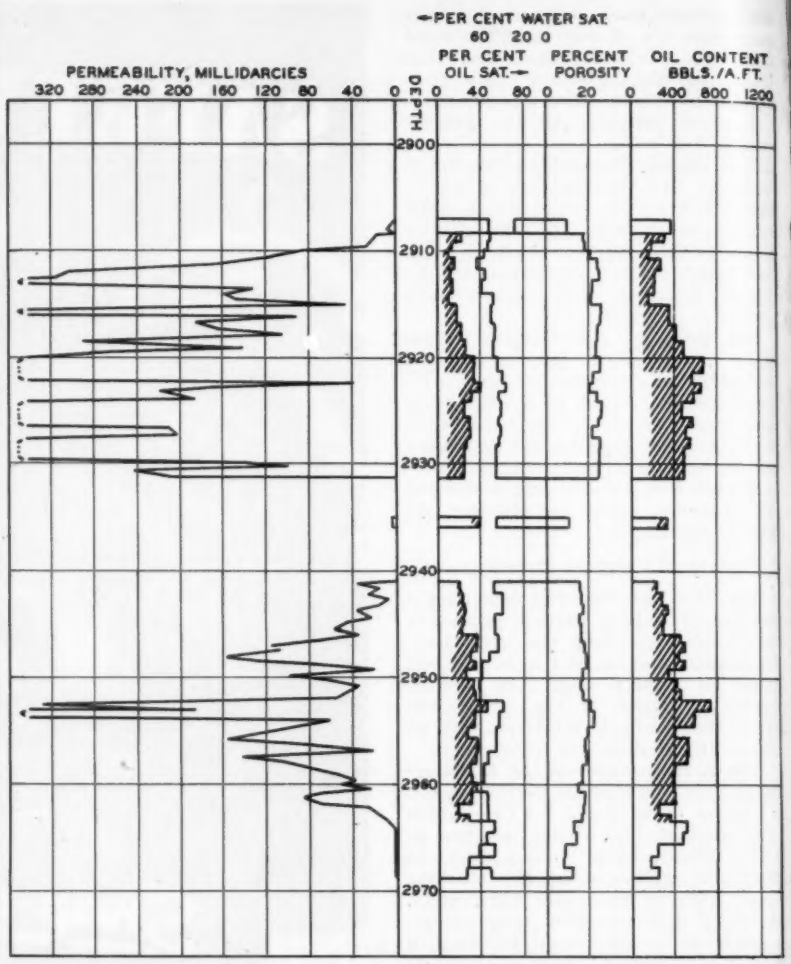

CORE ANALYSIS.—Kewanee Oil Co.'s 10 Bonto well, in Mid-Burbank area. Shaded areas represent recoverable oil percentages determined by laboratory "flood pot" tests. Cores above 2,932 ft. obtained by Electro-Drill method, below by No. 6 Baker cable-tool core barrel.

parison with other nonstimulated similar reservoirs that the effect has been in the order of 20 to 30 per cent increase over normal primary expectancy.

Geology.—The Pennsylvanian formations are in general conformable and are comprised of various lime, sand, and shale members. The pay section is known as the Burbank sand and lies at base of the Pennsylvanian group. The overlying Oswego and Big lime formations are excellent subsurface markers and sometimes carry oil and gas in noncommercial quantities.

The Burbank sand is a depositional sand bar which was laid down along the shores of an ancient Pennsylvanian sea during the Cherokee interval. Subsequent tectonic action tilted the formation, resulting in a monoclinal structure with a westerly dip of about 30 ft. per mile. In general the sand bars are shale bounded and limited in areal extensiveness which precludes the existence of water in any appreciable quantity.

The porous sand body is made up of medium to fine quartz grains, loosely cemented with calcareous material and contains only about 5 per cent silts, clays, etc. It is of interest to note that while local shale partings and impermeable streaks have been detected in sample cuttings, no major continuous zones can be identified or correlated throughout the sand body. The basal 4 ft. of the bar is a black impermeable sand which is referred to in well logs as "sticky or gummy shale" and marks the base of the porous sand.

The light-gray sandy shale, which has been previously mentioned, marks the top of the Burbank zone and has a direct bearing upon the thickness of the pay section in any one well. In general, the gross thickness of the sand bar ranges from 80 to 90 ft. with an effectiveness thickness ranging from 0 to 80 ft. depending upon the degree of redeposition that has occurred. The productive limits of the sand body are controlled on the west flank by diminishing porosity and permeability attributable to shale

and silt inclusions and on the east by an abrupt gradation from sand to dark shale.

Porosity.—While various cores have indicated porosity values ranging from 10 to 28 per cent, value of 17 per cent has been taken as representative of the over-all average.

Connate water.—From cores taken with oil in various parts of the area, a connate-water factor of 28 per cent has been indicated and adopted in reservoir calculations.

Reservoir volume factor.—Although no actual determinations were made in the unit area, a volume factor of 1.2 per cent has been accepted as being representative of reservoir conditions, based upon several analyses of bottom-hole fluid from South Burbank unit wells.

The produced oil is a sweet intermediate-type crude with a yellowish-green color and a gravity of 38°-40° A.P.I. The viscosity of the oil under water-flooding conditions at reservoir temperature is estimated at 2 cp. On the present market the oil sells for an average price of $2.63 per barrel.

Permeability.—Two core profiles taken from wells offsetting the unit, and one within the unit, showed variation in permeabilities which ranged from 10 to 800 md.

Summary of Primary Reservoir Data

The following tabulation for the Mid-Burbank unit is presented to reflect pertinent reservoir information. From these values the operators obtained conclusions on the effectiveness of primary measures, and formulated predictions for future waterflood expectancy.

Planimetered productive area, acres	862
Planimetered net sand volume, acre-ft.	31,430
Average porosity, per cent	17
Average connate water, per cent	28
Formation volume factor, per cent	1.2

	Barrels	Barrels per acre-ft.	Per cent of pore space
Total reservoir volume	41,451,769	1,319	100.0
Connate water	11,606,495	369	28.0
Oil in place—reservoir	29,845,274	950	72.0
Oil in place—stock tank	24,871,061	791	60.0
Cumulative recovery to 7-1-50	5,788,131	184	13.9
Free gas volume to 7-1-50	10,762,337	343	26.0
Remaining oil saturation to 7-1-50	19,082,937	607	46.0

Water-Flood Reserves

Residual saturation.—The waterflood reserves under the Mid-Burbank unit have been evaluated from basic reservoir data, representative core analyses, and information obtained from actual water-flood histories in similar reservoirs. Flood-pot analyses on cores from the unit and other Burbank leases have indicated residual oil saturations in the order of 12 to 25 per cent of pore volume. On this basis, it is believed that the oil saturation in the portion of the unit reservoir to be subjected to water drive can be reduced to an average of at least 22 per cent without circulating excessive volumes of water.

Flood efficiency.—Based upon flood results on sands of similar permeability characteristics, it is believed that a maximum of 60 per cent of the pore volume will be swept by the injected water.

Since flood efficiency is functional to the effectiveness of measures designed to minimize bypassing, the successful exclusion of the highly permeable zones of 300 to 800 md. as they reach the depletion stage is of utmost importance in the prevention of excess water circulation.

The area assumed to be contained within the effective zone of flood influence was arbitrarily defined by the limits of a 20-acre five-spot pattern. Since the attainment of this pattern is contingent upon structural and sand relationship, the final delineation of the economic productive

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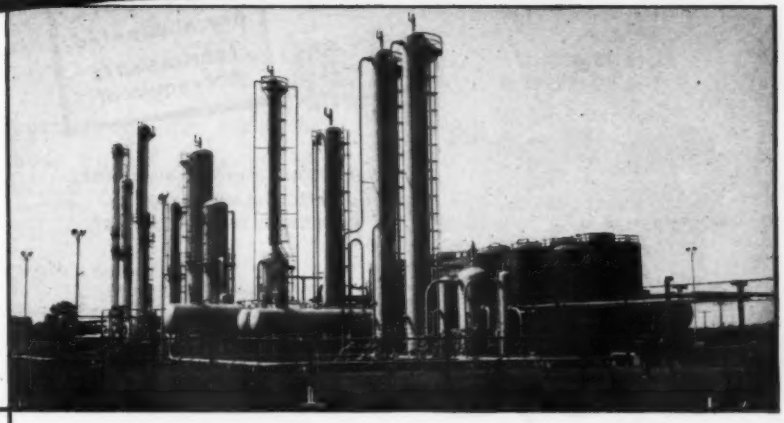

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limits must await the results of progressive development in the sparsely drilled areas.

The estimated water-flood reserves appear to be, tentatively, of the following order of magnitude:

Primary reserves as of January 1, 1951, bbl.	600,000
Estimated production 7-1-50 to 1-1-51, bbl.	65,000
Planned date for initial water injection	July 1, 1951
Estimated production 1-1-51 to 7-1-51, bbl.	40,000
Flood area, acres	628
Reservoir volume in flood area, acre-ft.	27,835
Residual oil saturation, per cent of pore volume	22
Flood efficiency factor, per cent	60
Water-flood reserves, bbl.	4,989,480
Total unit reserves, bbl.	5,589,480

Plan for Water-Flood Development

In consideration of the unit's favorable reservoir characteristics the injection of 15,000 bbl. of water per day is believed possible through 37 wells. This is largely based upon the results of the North Burbank pilot flood wherein daily well volumes of 900 to 1,100 bbl. of water per day per injection well have been returned under a gravity head. From these data it is presently planned to initiate the flood program on a daily injectivity rate of from 0.5 to 0.6 bbl. per acre-foot, or approximately 10 bbl. per foot of permeable sand above 10 md. From present indications it is believed these rates can be accomplished without resorting to pressure injection, up to at least the stage of reservoir fillup.

As to the type of flood most applicable to the unit reservoir, the operators first considered the feasibility of a line or peripheral drive. However, due to the negligible structural relief and extreme variation in permeabilities, the method was rejected because of the hazards of bypassing which might result in the entrapment of oil and/or an erratic sweep of the porous medium.

The type of flood finally accepted is patterned upon a 20-acre five-spot development, utilizing present wells wherever feasible. The adoption of this pattern is justified on the theory that maximum flood efficiency will more likely be attained with a uniform and equilateral movement of the driving fluid. Further, the operators reasoned that development costs will be held to a minimum in effecting the desired results. In this regard, the proposed pattern will require the drilling of 26 wells.

Relative to offsetting acreage development, verbal assent has been obtained from the South Burbank unit operators to insure cooperation along the common boundary line. Likewise, on the north end of the unit cooperation is assured in the mutual development of a flood pattern which will be beneficial to all parties.

From calculations on flood expectancy, an approximate input volume of 50,000,000 bbl. of water is projected over the flood life. Of this volume, a total barrelage of 25,000,000 is expected to be furnished from proposed supply system to the Arkansas River (in cooperation with the North Burbank unit), with the remainder being recycled produced water.

While a number of floods throughout the Mid-Continent area are successfully being flowed, there are no data available which can be used reliably to predict the ultimate success of a flood at well depths and spacing comparable to Mid-Burbank conditions. Further, in view of the extreme range of permeabilities which is conducive to bypassing and/or low flood efficiency the resort to pumping withdrawals appears to offer a more rigid control than could be realized under flowing conditions.

Upon these postulations, there appears ample justification for the decision to attempt depletion of the flood reserves by pumping. For the present it is proposed to utilize existing equipment until fluid volumes exceed the rated capacities. At such time, replacements will be effected, installing surface and subsurface equipment which will conform to the predicted load calculations incident to the lifting of 200 or 300 bbl. of fluid per well per day.

As the economic limit of the flood is approached with attendant high

(Continued on page 95)

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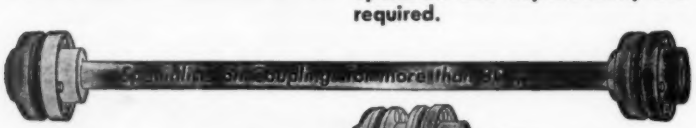

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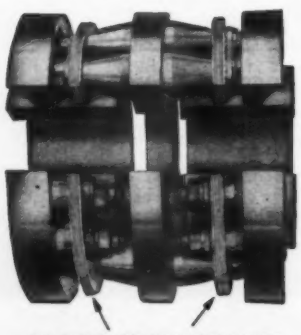

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Attenuation Curves in Cathodic Protection

POPE[1] and others[2,3] have given mathematical expressions for the attenuation of current and potential in a long uniform structure with uniform leakage. These expressions are applicable to buried pipe lines insofar as they satisfy the assumption of uniformity in coating conductance and soil resistivity. The relationships which they exemplify are quite useful even when there is a considerable departure from the assumed uniformity, and, with proper care, they may be used in the design of cathodic-protection systems, and in the investigation of the performance of systems already in operation.

The quantities appearing in the equation are:

R_S = structure resistance, in ohms per kilofoot.

R_L = leakage resistance, in kilofoot-ohms. This is the resistance to remote earth of a 1,000-ft. isolated section of structure; it involves the surface or film resistance, the resistance of the coating, and the soil resistivity; the soil immediately adjacent to the pipe has greater influence than more remote soil.

R_G = ground resistance of the structure, in ohms. This is the resistance to remote earth of the entire structure, considered as being infinitely long, measured at a single point.

R_K = characteristic resistance of the structure, in ohms. This is the resistance to remote earth of the structure looking in one direction from a given point. If the structure is uniform throughout, R_K is exactly twice R_G.

$$R_K = 2R_G \qquad (1)$$

Another relation between the R quantities is:

$$R_K = (R_S R_L)^{1/2} \qquad (2)$$

The attenuation constant, per kilofoot is designated a. This expresses the rate at which the various electrical quantities are attenuated:

$$a = (R_S/R_L)^{1/2} \qquad (3)$$

$$a = R_S/R_K \qquad (4)$$

There are three basic electrical variables with whose attenuation we are concerned; these are:

V = pipe-to-soil potential shift, in volts; i.e., the difference between the potential at a given point with and without the drainage current.

I = current in the line, in amperes.

i = cathodic current density, in amperes per square foot.

These three quantities will be written with subscript letters to indicate the point along the line (x measured in kilofoot from the drainage point) where the variable is being considered. I_o, the line current at the drainage point, means the current from one direction only, and is therefore one-half the total current being drained.

The three expressions for the attenuation of the variables are identical in form:

$$V_x = V_o e^{-ax} \qquad (5)$$

$$I_x = I_o e^{-ax} \qquad (6)$$

$$i_x = i_o e^{-ax} \qquad (7)$$

Each of these three equations will plot on semilogarithmic paper as a straight line, the slope of which is determined by the constant a. With suitable scales, then, all three may be shown on a single diagram.

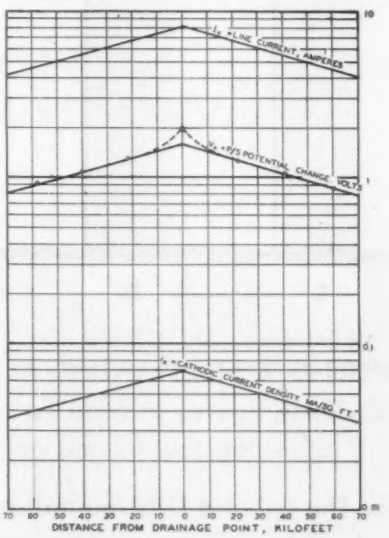
I_x = LINE CURRENT, AMPERES
V_x = P/S POTENTIAL CHANGE, VOLTS
i_x = CATHODIC CURRENT DENSITY, MA/SQ. FT.
DISTANCE FROM DRAINAGE POINT, KILOFEET

Fig. 1—Attenuation curves on a 4-in. pipe line with excellent coating. Drainage current = $2I_o$ = 16.2 amp.; a = 0.01.

The limitations of these equations must be thoroughly understood. In addition to the assumption of uniformity, there has been made an assumption that the current drained from the line is discharged to earth, not through a nearby ground bed, but at a point remote from the line. The actual presence near the line of the anode bed through which the current is discharged to earth results in a potential shift in the vicinity of the drainage point greater than V_x given by Equation 5. Consequently an accurate attenuation curve can only be plotted from a set of points none of which is too near the drainage point.

Values from which the curve in Fig. 1 were plotted are shown by small circles; the dotted portion of the curve shows the distortion due to the proximity effect of the anode bed. Six values were read for V_x, far enough from the drainage point to avoid the distortion; the curve for I_x was plotted to the same slope, based on the single value of the drainage current $2I_o$; the value of i_o was calculated and its curve drawn parallel to the others.

Where a break in the electrical continuity of a uniform line exists, either as an insulated joint or as a severed line during repair or remodeling operations, an opportunity exists for the direct measurement of R_K. The resistance measured across the break may be taken as twice R_K, consisting as it does of the two line sections in series, although Sunde[4] points out that R_K is actually slightly greater than half this series resistance. With this value determined, and the pipe weight known, Equation 4 may be used to compute a. If a junction between a lateral and a main line is completely insulated, so that all three sections are segregated, then the three sums may be measured and all three separate values for R_K calculated by solving three simultaneous equations.

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1. Pope, Robert, "Attenuation of Forced Drainage Effects in Long Uniform Structures," Corrosion, Vol. 2, p. 307, Dec. 1946

2. Ewing, Scott, "Soil Corrosion and Pipe Line Protection," Chap. X, p. 228, American Gas Association, 1938.

3. Gear, Harry C., "Current Density Related to Current Distribution," Petroleum Engineer Reference Annual 1943.

4. Sunde, E. D., Earth Conduction Effects in Transmission Systems, Chap. 6, p. 187, Van Nostrand 1949.

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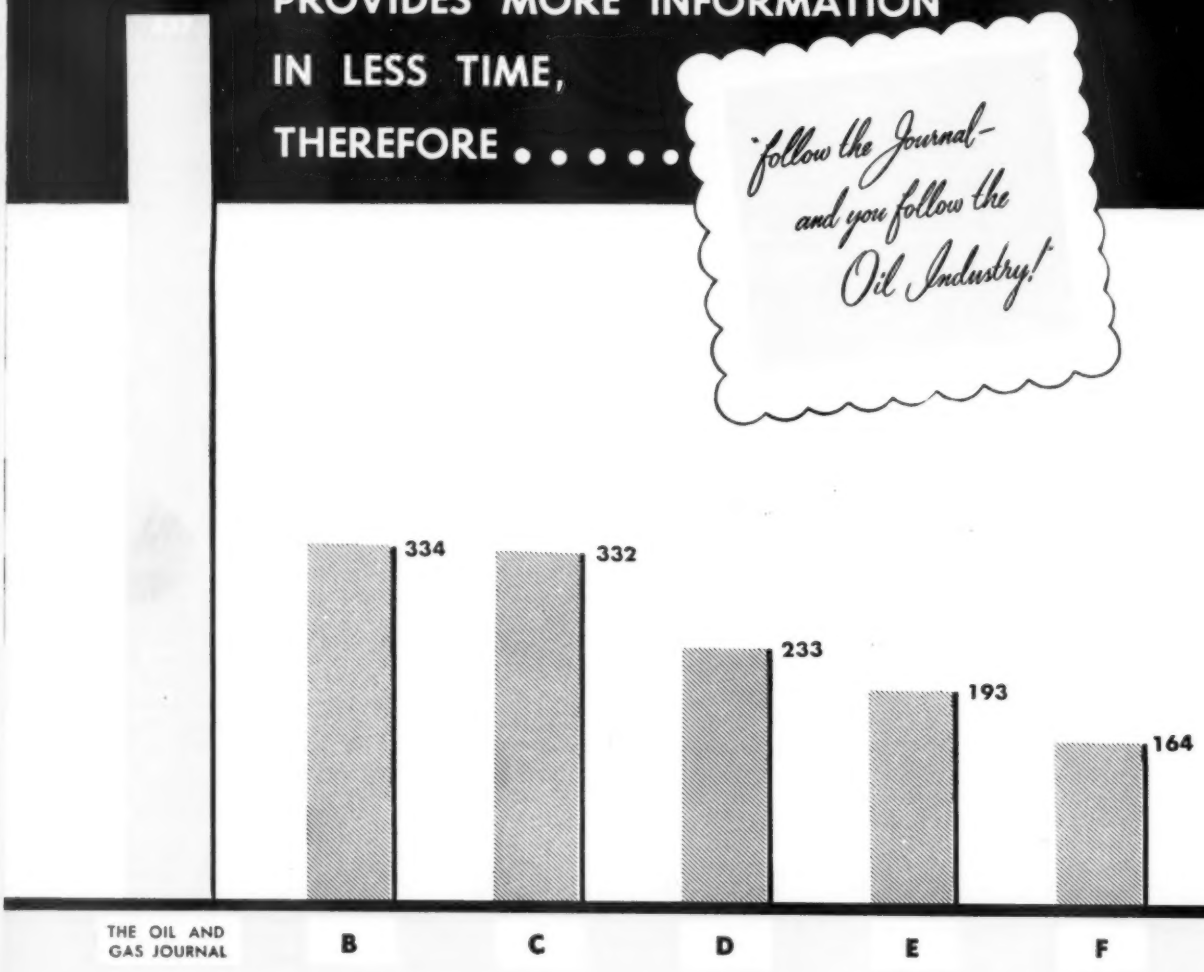

COMPARISON OF ENGINEERING AND OPERATING ARTICLES BY OIL PUBLICATIONS DURING YEAR 1950. These figures provide further proof why *only* the Journal can say to oil men . . . "follow the Journal and you follow the oil industry."

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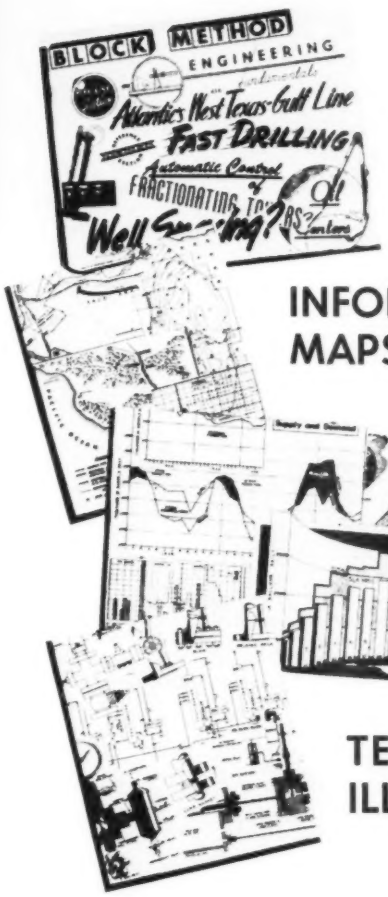

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Fig. 2—These steel drums contain the Scalite bed indicated in the flow diagram, Fig. 1.

Is your plant located in an area where good cooling water is at a premium? Here is described a new method of

Controlling Scale in Cooling Towers Without Increasing Water Use

by M. A. Enquist*

CONTROL of scale in heat-exchange units associated with cooling towers, and the prevention of delignification usually is accomplished by purging, overflowing, or bleeding off water into the sewer. Often this results in the essential water consumption being increased as much as 50 per cent.

For this reason, a scale-control method which does not lead to increased water consumption is highly desirable, and especially so in areas where good cooling water is at a premium. Such a method of controlling scale formation, one which reduces the water consumption of a cooling tower to that required for cooling plus drift loss, is described here: However, before taking up the method, a brief discussion of the problem involved is in order.

Analysis of scale in heat exchangers indicates calcium carbonate is the principal deposit with magnesium, iron, and silicate being present as minor constituents. Although organic matter often is present in amounts equal to the calcium, the cementing agent is believed to be calcium carbonate.

*Metallic Phosphate Products Co., Alhambra., Calif.

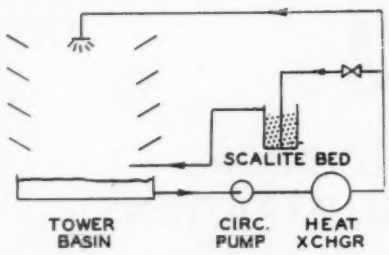

Fig. 1—Flow scheme for scale control in cooling-water system.

A cooling-tower-water analysis, when compared with a Langelier saturation chart after indicates the sample is supersaturated with respect to calcium although scale may not be encountered. This phenomenon also is observed in oil-well brines of high calcium content. Such a brine may have as much as 1,000 p.p.m. of calcium carbonate in excess of its saturation value. The brine, however, most likely will be found corrosive in the hole, with scale formation occurring several days later and after it has left the wash tank.

Careful inspection of cooling-tower-water analyses and oil-well brines, as well as investigation of scale history, have demonstrated the existence of a time lag between supersaturation and deposition of calcium carbonate. This time lag has been measured at from 12 to 36 hours varying with temperature and water composition.

The existence of the time lag enables the application of crystallization techniques to scale prevention, i.e., contacting the circulating water continuously with a like substance, or to "seed" the water. This procedure is much the same technique as dropping a salt crystal into a supersaturated solution of salt.

Its operation would require passing the water through a bed of a like substance. This bed, if properly designed, would also filter out suspended and other organic matter which often contribute greatly to the volume, and perhaps to the formation, of scale. Thus a combination of scale control and filtration would be effected.

In preliminary tests, limestone was used as the contact medium, with a small quantity of recirculated water being bypassed through the limestone bed. While this material proved unsatisfactory, these tests did establish the requirements for a contact medium. One of these was that it must have a good crystal strength; soft crystals tend to slough off, precipitating the calcium carbonate further downstream and actually increasing scale deposition.

Continued experiments led to the use of a mineral which is mined in northern California and sold under the trade name Scalite. This material gave excellent results.

In this experimental work, the test unit consisted of a water pan, circulating pump, spray nozzle, and evaporation screen. Hot air was continuously blown through the wetted screen. Measurement of the restriction in air flow served as an indication of scale formation or solids build-up (see Table 1).

An interesting result of these tests was the development of an additive chemical which caused the water upon hitting the screen to form droplets and run off, dropping back into the pan. Without this chemical a slight buildup of solids could be detected on the portion of the screen not well wetted. This chemical, called Anti-Mist, is a high-molecular-weight organic substance with no other function than that of preventing the water from misting and drying on these poorly wetted surfaces.

TABLE 1—TEST RESULTS*

Scale-prevention method—	Cu. ft. per minute air reduction at end of 22 days	Gal./hr. evaporated (avg.)
None	470	2.9
Tannin-phosphate	450	3.3
Scalite bed with Anti-Mist	000	4.9

*Initial air temperature was 110° F., makeup-water hardness 60 p.p.m. as calcium carbonate.

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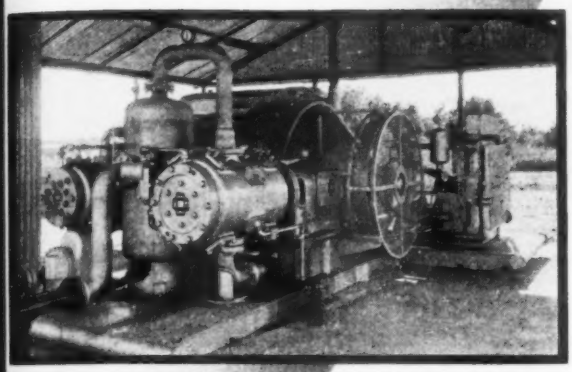
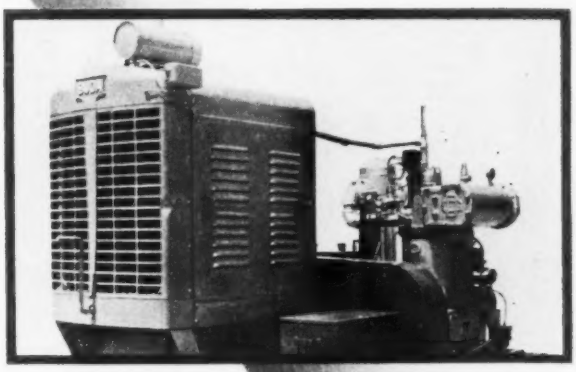
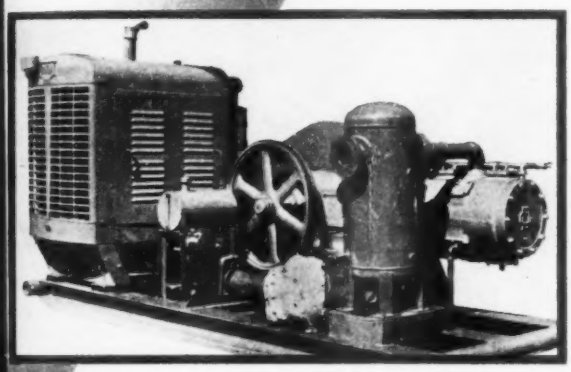


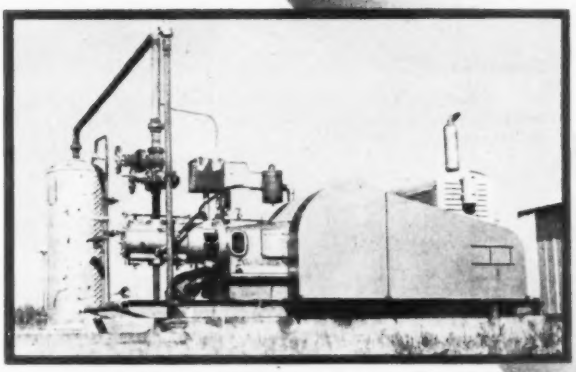
Gas engine driven 12 and 6 x 13 compressor for re-pressuring service



Engine driven model ABE for re-pressuring or booster service



Engine driven 8 x 9 booster compressor



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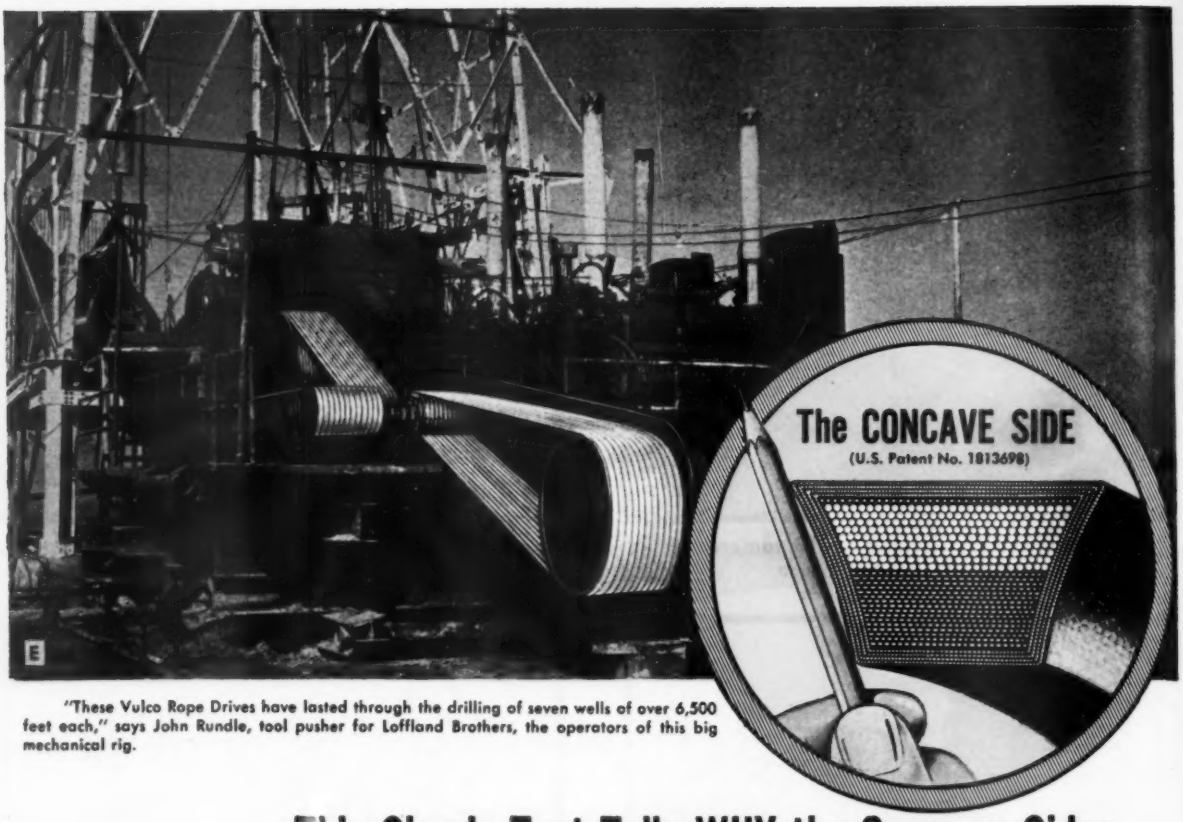

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Prove this *yourself*—in two minutes' time.

Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

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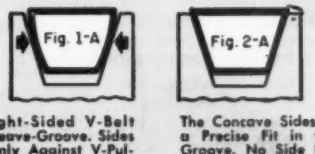
What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

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Following this experimental work the method was applied at several California plants. The method was incorporated in the cooling-water systems as shown in Fig. 1, with the Scalite bed placed in used oil drums as shown in the photograph, Fig. 2.

Two of these plants employ extremely hard makeup water, 500 p.p.m. soap hardness. Two use makeup water of about 100 p.p.m. soap hardness and one has a soft-water makeup, about 30 p.p.m. soap hardness. All have been in operation about 10 months.

One user has experienced a slight buildup of scale (less, however, than he has been accustomed to) attributable to improper bed maintenance. Since the Scalite bed absorbs crystalline calcium and magnesium salts, it increases in volume. If this bed is not agitated by backwash about every 3 days, the particles will cement together blocking water flow.

One tower has shown a 10° F. drop in condenser terminal temperatures. This drop is attributed to the filtering action of the bed in removing suspended matter believed to have been clogging the condenser passages.

The amount of water circulated through the bed has been found to be a function of water hardness, temperature, etc., but usually averages 1 to 2 per cent of the tower circulation rate. Maintenance of this rate of flow is the only control requirement. The amount of Anti-Mist required is determined visually—when solids appear to be building up on the tower, Anti-Mist is added. A 1,000-g.p.m. tower, which required about $50 worth of Scalite in the bed, has needed only about $10 worth of Anti-Mist each month.

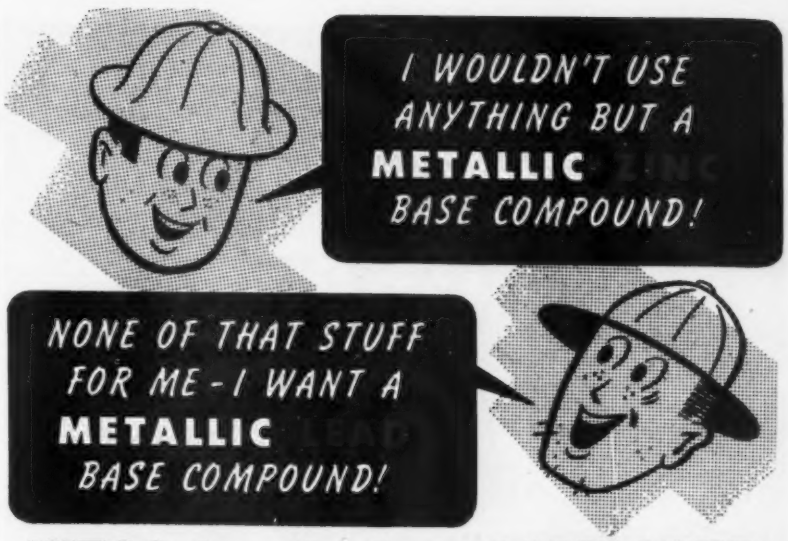
A water analysis of one tower after 10 months of operation is given in Table 2. As shown, the pH of the tower water is 8.4, which is about the saturation pH for calcium carbonate. Periodic tests indicate this pH maintains itself at this constant value for all waters encountered to date.

This automatic pH control inherent in the method indicates corrosion-inhibiting possibilities. Applied to a brine-cooling system periodically contaminated with sulfuric acid, the corrosion rate was reduced from 100 to less than 10 mg. per sq. dm. per day.

TABLE 2—WATER ANALYSIS OF JACKET-WATER COOLING TOWER

(Natural-draft-type tower, 1,000 g.p.m. circulation rate)

	Makeup (p.p.m.)	Tower (p.p.m.)
Phenolphthalein alkalinity, as $CaCO_3$	0	74
Methyl orange alkalinity, as $CaCO_3$	240	444
Sodium chloride	120	1,900
Sulfates (radical)	366	2,950
Calcium (element)	140	224
Magnesium (element)	36	472
Silicon dioxide	6	8
Total dissolved solids (conductivity)	920	11,000
Soap hardness as $CaCO_3$	500	2,500
pH	8.2	8.4



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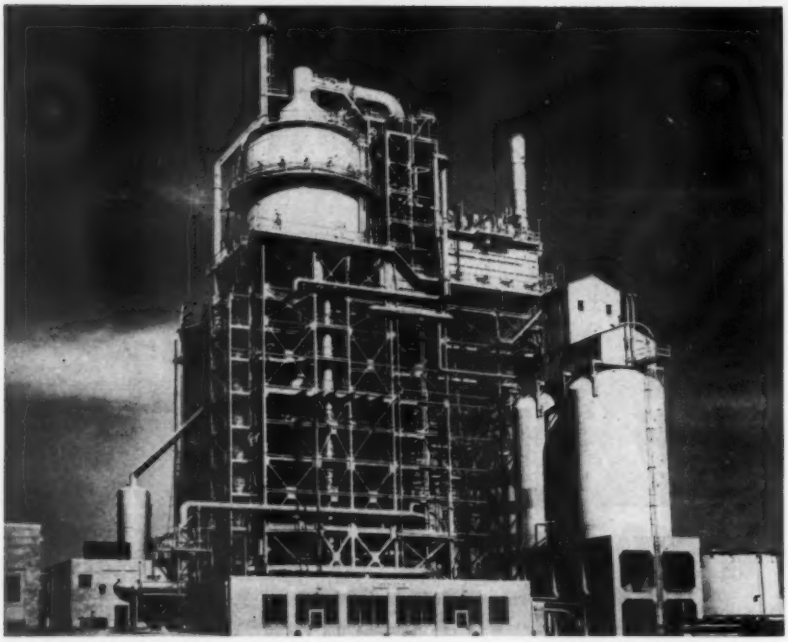

Sunray Oil Corp.'s record-smashing 12,500-bbl.-per-day U.O.P. fluid cat cracker.

Sunray Cat Runs 677 Continuous Days for New Operating Record

by R. L. Johnson

ON January 13, 1951, Sunray Oil Corp.'s 12,500-bbl. per day U.O.P. fluid cat cracker, located at its Duncan, Okla., refinery, was shut down for turnaround after running for 677 consecutive days, establishing a new world's record for continuous operation. The former world's record of 610½ days, surpassed by Sunray's unit on November 8, 1950, was set by another U.O.P. designed "cat" unit at Tide Water Associated Oil Co.'s Avon, Calif., refinery in 1948.

During Sunray's record run a total of 6,807,219 bbl. of fresh gas oil feed was processed through the unit at an average rate of 10,054 bbl. per day. The recycle ratio was 1.64. Of the total amount processed, 3,394,540 bbl. of cat gasoline were produced; 1,497,807 bbl. of liquid C_3 and C_4; 1,317,673 bbl. of light cycle oil; 203,507 bbl. of heavy cycle oil; 258,039 bbl. of slurry oil, and gas in equivalent value of 419,857 bbl. of fuel oil. Catalyst loss during the run averaged 0.212 lb. per barrel processed. The cat cracker onstream efficiency has been calculated at 99.7 per cent.

During the greater part of the run 2,212 bbl. of C_3 and C_4 were charged daily to the polymerization plant which produced 1,010 bbl. of 30 lb. R.v.p. polymer gasoline, 620 bbl. of B-B, and 360 bbl. of propane. During the latter part of the cat cracking run the B-B was sold for synthetic-rubber manufacture and only the C_3's charged to the poly unit. In this operation 770 bbl. per day of C_3 was charged to the unit, producing 290 bbl. of 7 lb. R.v.p. polymer gasoline and 360 bbl. of propane.

Average daily production from the crude unit amounted to 6,500 bbl. of straightrun gasoline, 3,500 bbl. of No. 1 distillate, 8,880 bbl. of straightrun and vacuum gas oil, and 3,330 bbl. of residual fuel from the vis breaker.

The crudes processed were predominantly Mid-Continent in character with A.P.I. gravities ranging from 28.5° to 37.8°.

A summary of the inspectors' survey of the cat cracker and auxiliary units following shutdown disclosed that the entire system was in remarkably good condition.

The realization that the unit would not require any major overhaul attention convinced us that the turnaround could be accomplished as set up by our preplanned schedule in 3 weeks' time. This estimate was based on a labor force comprised of 175 of our refinery personnel augmented by an outside crew of 90 men working approximately 5,300 man-hours per day. The estimate was contingent, of course, on good weather cooperation.

The high efficiency of operation maintained throughout the record-breaking run and the good condition of the unit at shutdown is an indication of the interest and perseverance shown by our supervisory and operating personnel and the excellence of revamp design from wartime to commercial operation as engineered by Universal Oil Products Co., Chicago.

Sunray purchased its Duncan refinery from Defense Plant Corp. in 1947. The existing facilities at that time had been designed solely for the production of 100-octane gasoline. Prior to its purchase, however, F. L. Martin, executive vice president, consulted with Universal Oil Products Co., original designers of the refinery, on the possibility of converting the plant into a profitable commercial refinery.

Principal elements were the cat cracker, a gas-concentration system, a hydrogen fluoride alkylation unit, which produced 2,500 bbl. per day of alkylate; an isomerization plant capable of producing 300 bbl. per day of isobutane; and a modern boiler plant consisting of five boilers, each delivering 55,000 lb. of steam per hour at 275 lb. of pressure.

Revamp Plans Submitted

After a thorough study of all factors involved, Universal presented Sunray with a plan for the revamp of the refinery to commercial operation and on this basis recommended purchase of the plant.

As soon as negotiations were completed for purchase of the refinery reconversion was started, making use of existing facilities to the fullest extent and buying a minimum of new material and equipment. The project was laid out and the elements for reconversion were designed by Universal engineers.

The cat cracker had been built for two-stage operation, one stage for cracking fresh gas oil and the other for re-treating the cracked gasoline. The two stages had a common regenerator but two reactors, two large fractionating columns, and separate

THE AUTHOR

R. L. Johnson received his B.S. degree from Missouri School of Mines in 1920. Following graduation he joined Oil State Refining Co. and remained on the staff after it was purchased by Homaskla Oil Co., which was subsequently purchased by Sunray Oil Corp. Prior to his coming to the Duncan refinery as manager, Johnson had served as manager of Sunray's Allen, Okla., refinery.

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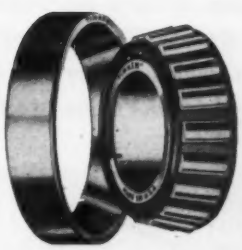

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auxiliaries, such as condenser boxes.

It was decided to operate the cat cracker as a single-stage unit, which required extensive changes in both the reactor and regenerator sections. The large feed heater was no longer necessary for this operation, so this heater and the re-treat fractionating column were taken as basic elements for a new topping unit. A large settler from the H-F alkylation plant was converted into a vacuum column with the addition of a small heater with necessary auxiliaries.

A polymerization unit was added and a propane unit installed, utilizing equipment on the ground, with the exception of the poly unit reactors and the propane storage reactors, which were purchased new. Treating equipment for the various products was likewise built.

Pipe lines were a necessary part of the reconversion project to afford cheap transportation of crude in and products out of the refinery. An 8-in. products line was laid from Duncan to Sunray's other refinery located at Allen, Okla. At the same time a short line was being laid to bring crude oil from Velma field to the refinery and additional lines were laid to various fields in south-central Oklahoma. Three modern pipe-line pump stations and eight 80,000-bbl. storage tanks were constructed at Allen, Wynnewood, and Duncan.

The bulk of the gasoline produced at Duncan is transported through the Great Lakes Pipe Line to the Middle West. The remainder is shipped by truck. Fuel oil and light burning oil is shipped by tank car and the No. 1 distillate is shipped through the pipe line. Storage capacity at Duncan totals 1,200,000 bbl.

Orderly Water-Flood Program

(Continued from page 82)

water-oil ratios, there exists the possibility of additional oil recovery through flowing.

For the estimated water-flood performance, at a daily injection rate of 15,000 bbl. of water, the "free gas space" (10,762,337 bbl. or 343 bbl. per acre-foot) is expected to be filled in approximately 24 months. However, from previous flood experience it has been demonstrated that the initial oil movement has occurred after about 70 per cent of the calculated volume has been returned. Further, it has been shown that peculiarities exist in the various five-spot units which result in earlier responses to flood stimulation. In consideration of these factors, a prediction has been advanced that the initial oil increase response will be evidenced in approximately 14 months.

Based upon empirical relationship, the over-all recovery of 4,989,482 bbl. of oil will require the injection of 50,000,000 bbl. of water or a 1 to 10 ratio. Further, the relationship of the injected water to the floodable pore volume approximates 145 per cent.

BOOKS

TECHNICAL PUBLICATIONS 1948. Edited by Arman E. Becker. Published by Standard Oil Co. (New Jersey) and affiliated companies. 512 pp.

The papers in this volume have been selected from more than 100 written by the companies' technologists and published in scientific journals during 1948. The diversity of papers will give the reader some idea of the research problems which daily confront the petroleum technologist, and of the skill and ingenuity he must use to solve them. Selection of the papers has been based largely on whether they contain new information of a stimulating nature. This volume is being distributed widely and will be available for reference purposes at larger colleges and universities, public libraries, and industrial research laboratories in the United States, and at some similar organizations in foreign countries.

HOW OIL IS FOUND. By W. A. Ver Wiebe. Published by the author, University of Wichita, Wichita, Kans. 247 pp. $8.50.

This book is ideally suited to the needs of the oil operator, lease broker, tax consultant, and drilling contractor. It is written in simple, easy-to-read style. The fundamental facts about reservoir rocks, such as the porosity and the permeability, are presented in the first two chapters. The third chapter goes into the details which explain the time of formation of rocks and also the conditions under which sediments were laid down. The next few chapters are devoted to the facts which explain oil pools. All kinds of oil traps are

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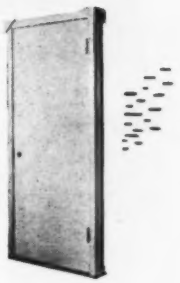

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described. Numerous examples of oil fields in various parts of the world are used to illustrate the theories involved. The book contains 312 drawings. They include maps showing groups of oil pools in various parts of the world and many cross-sections of underground strata and their relation to each other.

Statistics presented include data on oil production, per acre production, porosity measurements, permeability measurements, thickness of sands, and other data for the proper evaluation of oil properties.

The last chapter is devoted to the methods now being used by geologists and geophysicists to find additional oil pools. Instruments used to find new pools such as the plane table, seismograph, the gravimeter, and the magnetometer are described. Finally, some space is given to the methods of the future, such as the electrical and the geochemical methods.

OIL FIELD EXPLORATION AND DEVELOPMENT. By A. Beeby Thompson. Published by Technical Press, Ltd., London. 1,177 pp. in two volumes. $20.

This work, a second edition enlarged by the addition of new material, covers the entire petroleum industry throughout the world under two main divisions: Oil-field principles and oil-field practice.

Under "principles" this book discusses the distribution of petroleum, geographically, stratigraphically, and in relation to the larger tectonic features. There is a chapter on the origin of oil which includes the theories of origin, the relationship of paraffins and asphaltic-base oils, and the influence of environment on the character of oil. The migration and trapping of oil and the cause of oil-field pressures are the subject of another chapter. Other portions of the book discuss the character of oil-bearing strata, oil-field structures, and the significance of oil indications on the surface. Considerable space is allotted to phenomena associated with the development of oil fields. The geology of American, European, Asiatic, Australasian, and African oil fields is presented. The final chapter of this volume deals with the properties and treatment of petroleum.

Under "practice" is an introductory chapter on the history of oil-field progress, legislation and customs, leasing, royalties, and appraisals. A general discussion covers oil-well drilling, including cable and rotary drilling, circulating systems, fishing operations, testing, and costs. Casing and lining of oil wells is the subject of one chapter. The location and isolation of oil-field waters and the principles of guiding extraction methods are discussed. One chapter is devoted to oil-field equipment and another to the storage and transport of petroleum. The general occurrences and uses of natural gas and extractable products is the subject of another chapter.

There is an appendix of useful tables and data covering recent discoveries and developments in the Western Hemisphere, Europe, Middle East, Africa, and Australasia; production in the United States (1859-1949); and in the world (1880-1948). The two volumes contain 270 illustrations, 50 tables, and 8 maps.

FLOW MEASUREMENT WITH ORIFICE METERS. By Reid F. Stearns, Russell R. Johnson, Robert M. Jackson, and Charles A. Larson. Published by D. Van Nostrand Co., Inc., 250 Fourth Avenue, New York. 350 pp. $7.50.

This book is intended mainly for engineering, technical service, and instrument groups concerned with process control, test work, and plant startups in the petroleum industry. Its primary purpose is to provide these groups, insofar as possible, with one reference containing all the information required for the effective use of fixed-area orifice meters in common refinery applications. The volume is a project of Standard Oil Development Co., and is one of the Esso series. Methods of flow measurement with orifice meters are described extensively at professional society meetings, but these references are not readily available to refinery metering, since flow equations are not presented in the most convenient form and since data supplied for flow calculations are often inadequate for the purpose. The procedures outlined in this book typify methods currently used in refinery operations, and the physical data presented are limited for the most part to fluids found in petroleum refining. The principles and basic practices are, however, general in nature and may be employed as guides for fluid metering in other industries.

THE PRACTICE OF LUBRICATION. By T. C. Thomsen. Published by McGraw-Hill Book Co., Inc., 330 West Forty-Second Street, New York, 617 pp. $8.

The accelerated development of engines and machinery in the past decade has involved higher speeds, higher pressures, and temperature extremes, all of which have depended upon advances in the science of lubrication. This fourth edition takes cognizance of the necessary additives and procedures used in developing modern lubricants. A special chapter deals with the unique problems encountered in aircraft lubrication, and additions have been made describing the employment of fabric bearings in steel mills and the increasing use of rubber, press metal, and fiber bearings. A discussion of developments in lubricant manufacture, current facts on the distillation and refining of lubricating oils, information on the manufacture of engine-oil inhibitors, and descriptions of new solvent-refining processes are contained in this volume. The treatise provides a comprehensive coverage of the origin, nature, testing, selection, and application of all types of lubricants, analyzing several typical problems from an engineering standpoint to provide solutions based on sound lubricating principles. This book should prove valuable to lubricating, mechanical, and electrical engineers as well as engine designers, oil chemists and manufacturers, and others interested in efficient and correct lubrication procedures.

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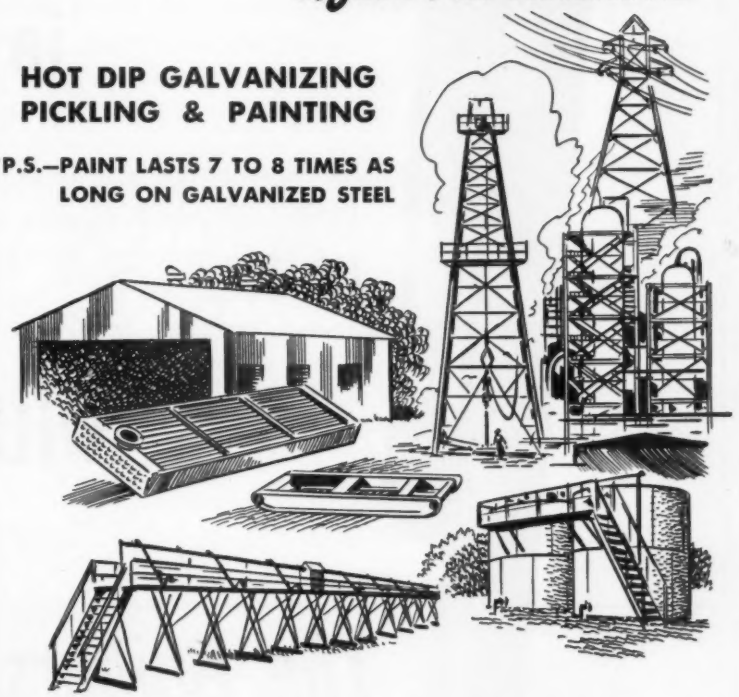

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PROGRESS in METALS

by W. L. Nelson
Consulting Engineer

Corrosion Resistance of Ductile Iron

THE discovery and development of nodular or ductile cast iron was a major addition to our technical knowledge. *Refer to "Nodular Cast Iron," The Oil and Gas Journal, May 19, 1940, page 365 and "Ductile Iron—Century's Greatest Advancement in Art of Cast Iron Manufacture," The Oil and Gas Journal, May 11, 1950.* The significance of this new development has not yet been completely explored or investigated. In ductile cast iron, the graphite is in the form of nodules or somewhat isolated pockets rather than semicontinuous flakes. The graphite is put into the form of nodules by the addition of small amounts of the metal magnesium.

The latest factor that comes to attention is the corrosion resistance of ductile iron. International Nickel Co. has been conducting tests and is planning further tests. In the September 1950 issue of Nickel Steel Topics, it submits the Table 1 shown on this page, and comments as follows:

1. Theoretically, the occurrence of graphite in the form of spheres rather than flakes would be expected to exert a basically favorable effect in any environment where graphite tends to accelerate corrosion of the iron matrix surrounding it. This is because (a) in galvanic couples, the extent of corrosion is influenced largely by the cathodic area—in this case the graphite; and (b) for a given mass of graphite, the spherical shape exposes the minimum surface area, much smaller than that of plates or flakes.

2. Moreover, the occurrence of graphite in the form of more or less isolated spheres as compared with flakes provides less chance that zones of corrosion adjacent to the graphite will become connected so as to provide a continuous path for penetration of corrosive media. Hence, in spite of the fact that the aluminum sulfate tests in Table 1 show that ductile iron is subject to graphite corrosion, the rate of penetration of this form of corrosion can be expected to be less than with ordinary cast irons.

3. The tests in sulfuric acid show that ductile iron tends to offer more resistance to acid attack when annealed so as to achieve a structure consisting essentially of ferrite and spheroidal graphite. In other words, the composition and structure which provide maximum ductility also provide maximum resistance to mineral acid corrosion. (Apparently the effect of cementite is to serve as an auxiliary cathode to graphite particles in accelerating attack by acids.)

4. In neutral or alkaline environments such as sea water we cannot anticipate any marked advantage for ductile iron over plain cast iron—except possibly along the lines discussed in (1) and (2) above. Any such advantages that may exist would not be disclosed by tests of such short duration as those already completed.

5. Preliminary studies of cathodic polarization in sea water have indicated, as would be expected, that it is no more difficult to polarize, or cathodically protect, ductile cast iron than plain cast iron.

6. Questions have been and will continue to be raised as to the merits or defects of the graphitic corrosion products that may develop on ductile iron as compared with ordinary iron in such environments as subsurface soils. In extreme cases, it has been observed that after many years underground cast-iron pipes have been converted almost completely to graphitic corrosion products and iron residues, and that this more or less compact material still serves the purpose for which the pipe was originally installed. Those interested primarily in high-phosphorus irons feel that the phosphorus, or phosphides, in the corrosion product serve to reinforce the graphitic portion of the residue, and that ductile iron of low phosphorus content will suffer from the lack of such reinforcement.

It is, of course, too early to have any evidence as to the nature of graphitic corrosion products formed on ductile-iron particles buried underground, but against any possible disadvantage associated with a low phosphorus content after corrosion has progressed to practically complete destruction of the iron, there are the advantages—from the start and while any iron remains—of high strength and ductility in the magnesium-containing iron.

7. In the light of present knowledge there appears to be no reason why ductile iron should not be applied in services where ordinary cast iron is satisfactory from a corrosion standpoint. It is expected that future developments will establish services where the superior corrosion resistance of the ductile iron will give it a definite advantage.

TABLE 1—SUMMARY OF MISCELLANEOUS DATA ON CORROSION RESISTANCE OF MAGNESIUM-CONTAINING CAST IRON

Test environment—	Corrosion rates in inch penetration per year			
	As cast		Heat treated‡	
	Gray iron*	Ductile iron†	Gray iron	Ductile iron
15 per cent aluminum sulfate at 110° F. for 14 days—unaerated	All specimens completely graphitized			
50 per cent sodium hydroxide at 70° F. for 232 hours and 260° F. for 228 hours	0.017	0.018	0.022	0.018
Bayonne tap water at 30° C.—aerated for 28 days	0.035	0.025	0.028	0.020
5 per cent sulfuric acid at 30° C.—aerated for 24 hours (see Note 1)	6.5	12.1	8.2	3.9
3.5 per cent sodium chloride at 30° C.—aerated for 28 days	0.027	0.025	0.021	0.016
Sea water at 60° F. for 4 days at 7.8 ft. per sec.	0.06	0.058	....	....

Note: Included in the sulfuric acid tests was a ductile cast iron which contained no nickel (T.C. 3.37 per cent, Si 3.25 per cent, Mn 0.21 per cent, P 0.062 per cent, Mg 0.036 per cent, Ni 0.06 per cent). Its rate of corrosion by 5 per cent sulfuric acid as cast was 5.2 in. per year (i.p.y.), and heat treated 4.2 i.p.y., thus indicating a greater advantage for heat treating the nickel iron as compared with the unalloyed ductile iron, though in the heat treated condition the nickel iron appeared to be no better than the unalloyed iron.

*T.C. 3.25 per cent, Si 2.92 per cent, Mn 0.60 per cent, P 0.08 per cent, S 0.17 per cent.

†T.C. 2.90 per cent, Si 2.55 per cent, Mn 0.48 per cent, P 0.076 per cent, Mg 0.072 per cent, Ni 1.44 per cent.

‡One-half hour at 1,750° F. furnace cool to 1,275° F. and 5 hours at 1,275° F.

Lead Additions to Steel

J. Woolman and A. Jacques in the July 1950 issue of the British Journal of the Iron and Steel Institute confirms the marked improvement in machinability obtained by lead additions to a large number of carbon and alloy steels.

They found that 0.15 to 0.20 per cent additions of lead have generally minor effects on normal tensile and impact properties of the steel in either the longitudinal or transverse directions. In some cases a slight tendency to lower ductility and toughness with addition of lead was observed.

However, marked reductions in fatigue resistance may result from lead additions; these reductions become greater as tensile strength of the steel increases. Thus, for a 78,000-psi. steel, the reduction was negligible; for a 107,000-psi. steel, it was about 5 to 10 per cent; and for a 164,000-psi. steel, about 20 per cent. Notch sensitivity in fatigue was not affected by lead additions.

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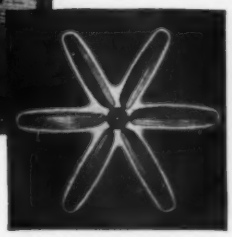

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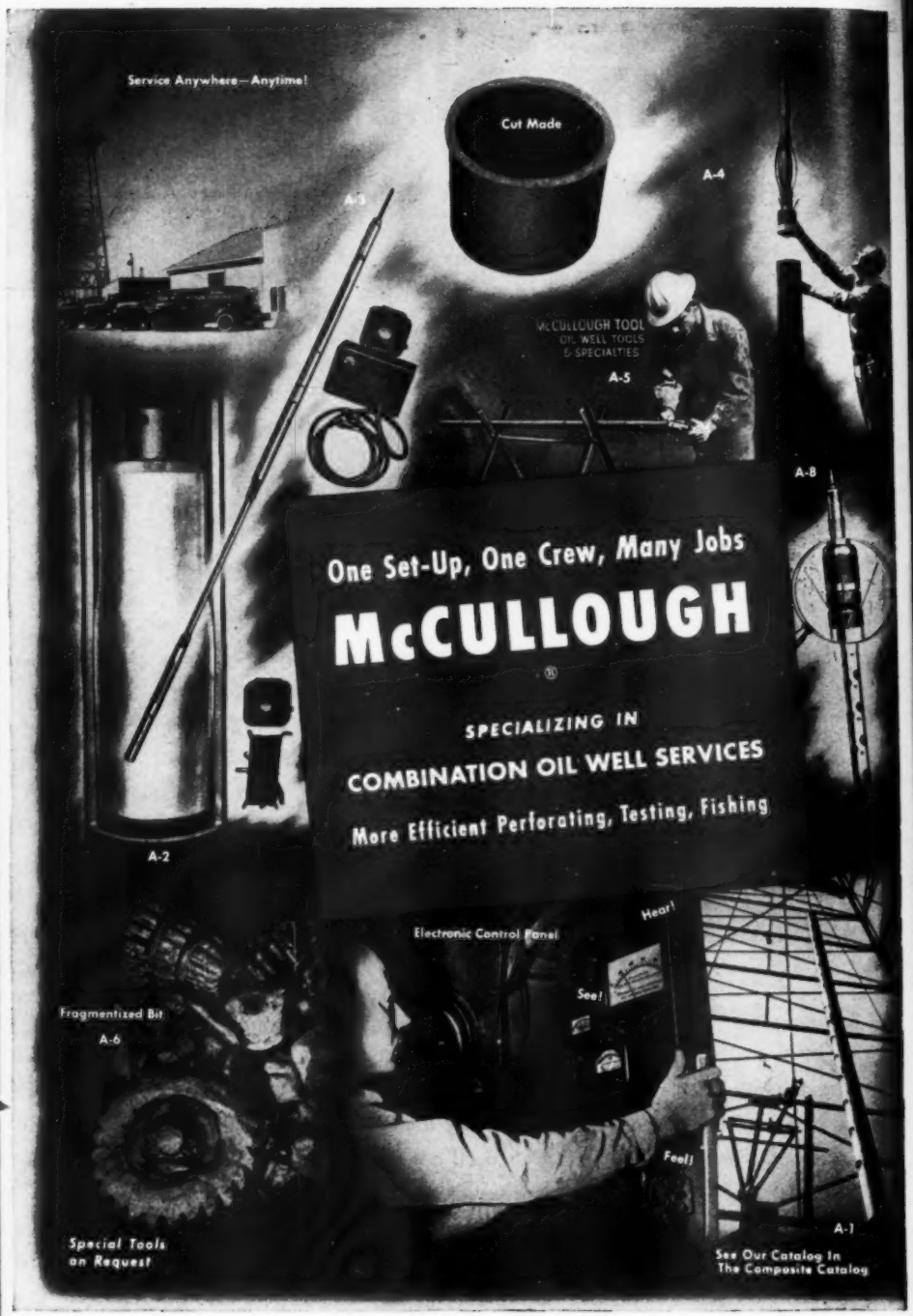

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Graphical Method for Calculation of Recovery From Constant Percentage Decline Curves

PRODUCTION-DECLINE curves are conveniently plotted on semilog paper with the production rate placed on the logarithmic scale. Cases arise where the decline is exponential in nature and a straight-line extrapolation of the semilog chart provides a simple means of predicting future rate of production and cumulative recovery. This type of decline curve is referred to as "constant percentage," "semilog," or "geometric." The equation for the decline curve in engineering terms may be expressed as follows:

$$P/P_i = (1 - r)^t \qquad (1)$$

where

P_i = the initial production rate
P = the production rate after an elapsed time t
r = the fractional decline over unit interval of time.

If the exponential decline applies it may be shown mathematically that the rate-cumulative curve will be linear, that is,

$$C = B\,(P_i - P) \qquad (2)$$

where

C = cumulative production
P_i = the initial production rate
P = the production rate at some future time
B = a constant dependent upon the rate of decline r

Equation 2 states that for a given rate of decline, equal increments of recovery will be obtained for each unit decline in production rate.

A common use of constant percentage or semilog decline curves is the determination of recovery between producing limits. From the relation of the term B to decline rate r, recovery can be calculated readily from Equation 2. When the decline rate is expressed as per cent per year (D), and production rate as barrels per day:

$$B = \frac{365}{-\log_e [(100 - D)/100]} \qquad (3)$$

Fig. 1 shows graphically the relationship between B and the decline rate, D, in per cent per year. For convenience, two curves are used. The lower curve shows decline rates to 10 per cent per year and refers to the left-hand and lower scales. The upper curve shows decline rates from 10 per cent to 5 per cent per year and refers to the right-hand and upper scales.

An example of the use of the chart is given as follows:

Problem: A lease is producing at an average rate of 100 bbl. of oil per day at an average decline rate of 23 per cent per year. It is desired to know the oil recovery at the constant decline rate when the production rate has reached 20 bbl. per day.

Solution: From Fig. 1, for a decline rate of 23 per cent per year, B is read as 1,400 bbl. per bbl. decline in average daily production. Therefore, the cumulative production is:

$$C = 1{,}400\,(100 - 20)$$
$$= 112{,}000 \text{ bbl.}$$

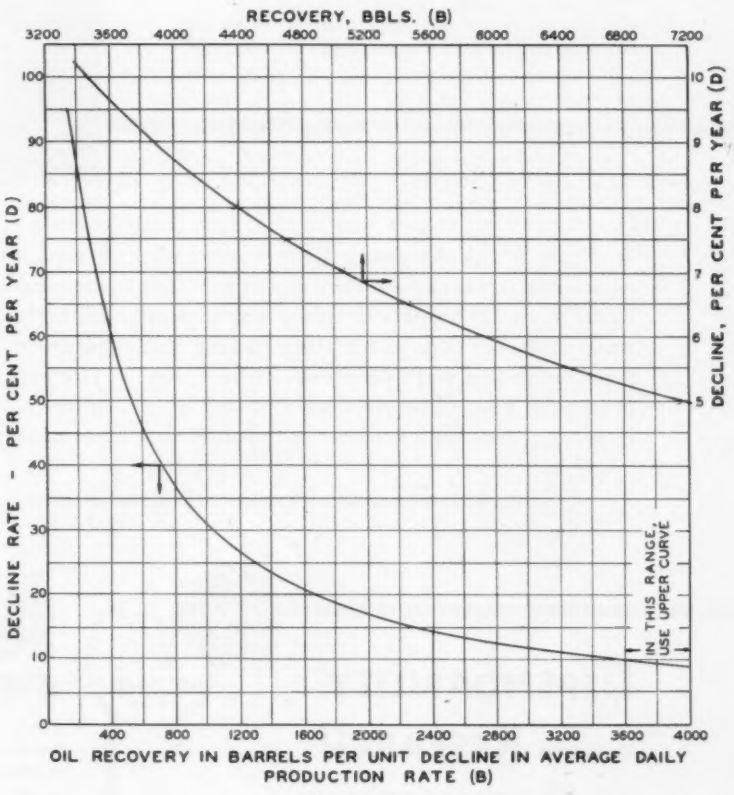
RECOVERY, BBLS. (B)
3200 3600 4000 4400 4800 5200 5600 6000 6400 6800 7200
DECLINE RATE - PER CENT PER YEAR (D)
100 90 80 70 60 50 40 30 20 10 0
DECLINE, PER CENT PER YEAR (D)
10 9 8 7 6 5
IN THIS RANGE, USE UPPER CURVE
400 800 1200 1600 2000 2400 2800 3200 3600 4000
OIL RECOVERY IN BARRELS PER UNIT DECLINE IN AVERAGE DAILY PRODUCTION RATE (B)

Fig. 1

By Rex W. Woods, consulting petroleum engineer, Tulsa

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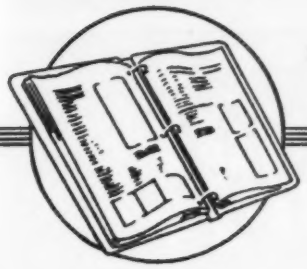

THE REFINER'S notebook

No. 63

Factors in Grease Characteristics*

IN earlier installments lubricating grease has been described as a semisolid compound which "stays put" in a bearing while possessing a directional fluidity which enables it to perform as a lubricant. In addition, on the basis of certain experimental evidence, it has been assumed that the polar soap molecules also add to the effectiveness of grease lubrication by forming a strongly adhering film of grease on the bearing surfaces that remains in place even under severe conditions of operation. These are lubricant qualities that are highly desirable in lubricating modern machines of various types—and appear to be singularly characteristic of lubricating greases.

Beyond such fundamental similarities, however, lubricating greases become as variable a group of related products as one could possibly imagine. There are literally hundreds of different greases marketed today. There are products that are essentially the same except for their brand name or trade designation; there are greases that differ only slightly from each other but are sold for widely differing purposes; there are specialized greases that have been developed for some narrowly specific uses. With this vast array of products, one of the chief difficulties in over-all discussion is that of finding some logical means of classifying them—of gathering together a number of different greases and discussing them as a group.

In the early beginnings of modern grease making, the one factor that appeared to have the chief influence on the properties and characteristics of a grease was the kind of metallic soap it contained. In the schematic illustration of Fig. 1 the arrow at the extreme left points to the metal atom that changes a fatty acid molecule into a metallic soap molecule. This metal atom has so much influence on the qualities and performance characteristics of greases that grease makers were inclined to classify their products by the contained soap—that is, as soda base, calcium or "lime" base, etc. This custom has carried on down to the present time. But recent research on greases has shown that there are many other factors in grease makeup that have as great if not greater influence on the characteristics of the finished product than does the kind of metallic soap employed. For example, the fats from which metallic soaps are produced also have a bearing on grease characteristics. Although molecules of a fat are made up primarily of carbon and hydrogen atoms, variations in number and arrangement of these atoms alter the behavior of the soap made from a fat.

According to the latest findings, the following factors are considered the most important in helping to establish the properties and characteristics of a grease:

1. The kind of metal atom in the soap or soaps.
2. The fats or fatty acids from which the soap is made.
3. The percentage of soap used.
4. The characteristics of the petroleum oil used.
5. Water, glycerin, and other materials that form an integral part of the original mixture.
6. Chemical "additives" that are added for specific purposes.
7. Techniques used in manufacturing.

In following installments these fundamental influencing factors are discussed in some detail along with a brief reference to current grease classifications.

In Fig. 1 at the right some outstanding performance characteristics as exhibited by each of the "older" greases are depicted. In future installments the trend toward the "newer" multipurpose greases, which combine these outstanding characteristics in a single grease, will also be discussed.

*From material prepared by Shell Oil Co. on "Fundamentals of Lubricating Greases."

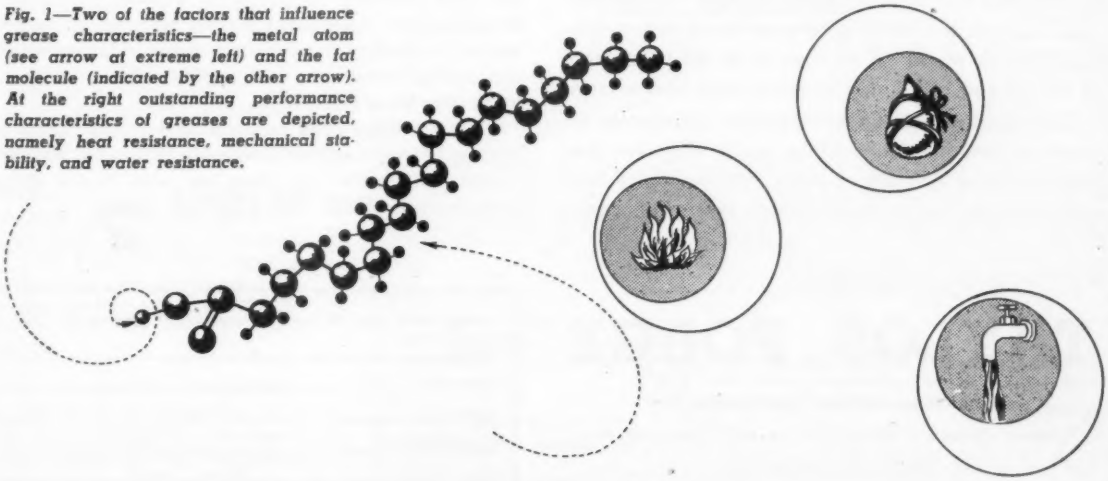

Fig. 1—Two of the factors that influence grease characteristics—the metal atom (see arrow at extreme left) and the fat molecule (indicated by the other arrow). At the right outstanding performance characteristics of greases are depicted, namely heat resistance, mechanical stability, and water resistance.

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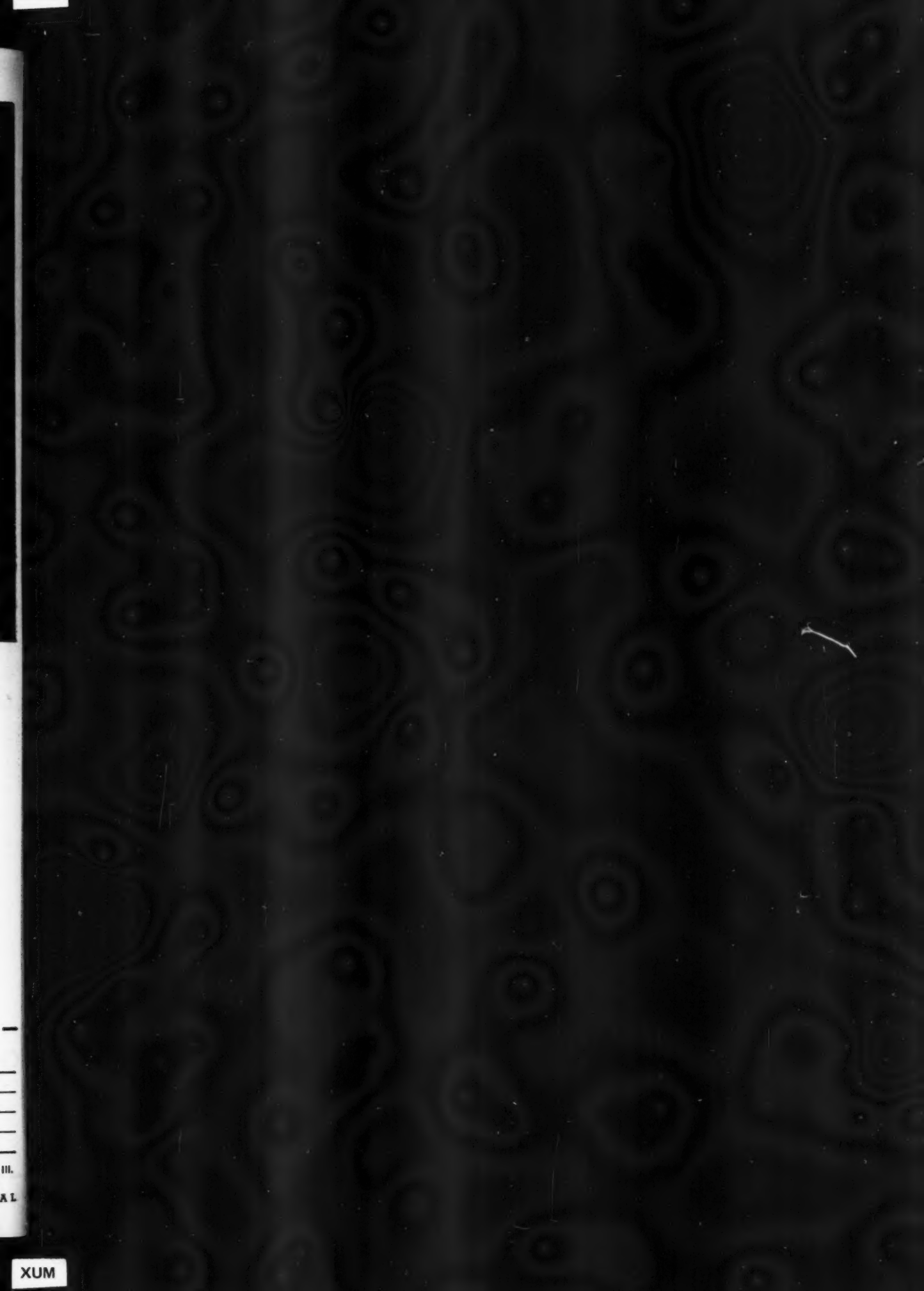

OIL AND GAS EQUIPMENT Digest

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TRADE LITERATURE

1 SARAN LINED PIPE, VALVES, AND FITTINGS points out the advantages of installing Saran-lined equipment in the processing plant. *Saran Lined Pipe Co.*

2 NEW 1951 TECHNICAL MANUAL explains the properties of its structural-steel footwalks, its power-forged and riveted open-steel grating and treads, Hexteel heavy-duty surface armor, and Ganister lining reinforcement meshes, Floorsteel flexible floor armor, open-steel and aluminum bridge decking, and flexsteel flexible open steel conveyor belt. *William F. Klemp Co.*

3 YEOMANS PUMPS, a 12-page, 2-color catalog is sectionalized under these services: corrosive and noncorrosive liquids; solids-carrying liquids; and dry and semidry materials. Cutaway illustrations describe operational features. *Yeomans Brothers Co.*

4 LOW-PRESSURE HANNA CYLINDERS includes a cylinder selector table for both pneumatic and hydraulic service. Data table gives cylinder capacities in pounds at various operating pressures. Seven different designs of pneumatic cylinders are fully described and illustrated. *Hanna Engineering Works.*

5 VAREC FINGER-TIP ELECTRONIC GAGER describes a remote-reading liquid-level gage. The eight-page bulletin explains field wiring, receivers, transmitters, and typical installations on various vessels. The text is well illustrated with both halftones and engineers' drawings. *Vapor Recovery Systems Co.*

6 NATURAL-GAS SCRUBBERS AND MIST EXTRACTORS is an illustrated article prepared by Thomas H. Pofahl, El Paso Natural Gas Co. Tables include data on liquid recovery rates on test models and installations operating in pipe-line service. *Clark Bros. Co., Inc.*

7 MELCO PACKAGE COMPRESSOR UNITS is an extensive data book on an economical, compact, rugged, gas-engine-driven compressor for portable or stationary service. The unit is engineered and designed for a wide field of applications and varies in size from 10 to 340 hp. *Max E. Landry, Inc.*

8 ORIFICE FITTINGS AND METER TUBES. New 32-page catalog features new equipment and improved line of orifice fittings and meter tubes. Elaborately illustrated with photographs and mechanical drawings. Features of line are new orifice and semiorifice fittings which are rated at 6,000 psi. c.w.p. 2,500 lb. A.S.A. in addition to standard equipment of manufacturer's line. *M. N. Aitken Co.*

9 HUDSON TP COOLING TOWERS. A 22-page brochure in color, pictures sizes and types to meet any requirement. Includes drawings and diagrams showing features of the advanced design and method of construction. *Hudson Engineering Corp.*

10 AUTOCON TANKTROL BULLETIN NO. 1100. This is a four-page bulletin explaining the reasons

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for using two bellows for control instead of the ordinary single-bellows design. It also outlines the results to be expected from this type of control, together with typical specifications. *Autocon Control Co.*

11 **JACK CATALOG.** A new 16-page bulletin 1515 illustrates and describes a complete line of ratchet, screw, and hydraulic jacks in capacities from 3 to 75 tons. Bulletin includes a table to help select the correct jack, application pictures, recommended uses for jacks, special features of jacks, and detailed specifications. *The Buda Co.*

12 **THE HOME OF SIGMUND PUMPS** contains a description of the facilities and organization which the firm is able to place at the disposal of pump users. The factory has been equipped to manufacture a range of equipment of high standard in design, workmanship, and performance. *Sigmund Pumps, Ltd.*

13 **TROUBLE SAVER.** Forty-eight photographs and line drawings give information on erection and dismantling of basic units, building up complete assemblies, available frames and components, and a wide variety of actual applications of a special nature. *The Patent Scaffolding Co., Inc.*

14 **SLUSH PUMPS.** The new Ideal type E-500 power slush pump with 7¾-in. maximum fluid cylinder liner bore and 14-in. stroke, and a maximum recommended working pressure of 3,500 psi., is covered in bulletin I-371. *National Supply Co.*

15 **AO EYE SAFETY GUIDE** lists eye-hazardous occupations and the recommended eye protection for specific industrial eye hazards. Completely illustrated, the guide is an ideal reference chart in that it contains a careful summary of recommendations made by the Safety Engineering Service Bureau of AO for eye-hazardous jobs throughout many industries. *American Optical Co.*

16 **DIESEL ENGINES, TYPES 4FS1 AND 4FS2.** Construction and operation features of the four-cycle, one-cylinder, and recently introduced two-cylinder, vertical, mechanical-injection, type 4FS diesel engines are contained in this new two-color Bulletin 183. Engines are built with a 4½-in. bore and 5¼-in. stroke. Within an operating speed range of 1,200 to 1,800 r.p.m. the one-cylinder engine develops 10 to 15 hp. and the two-cylinder unit, 20 to 30 hp. *Nordberg Manufacturing Co.*

17 **STEAM AND LIQUID CONTROL EQUIPMENT,** a new 56-page catalog contains illustrations and engineering data on precision pressure regulators, temperature regulators, float valves, water gages, float boxes, safety and relief valves, and strainers. *O. C. Keckley Co.*

18 **BEYOND YOUR BLUEPRINTS,** a 16-page catalog, illustrates and provides many useful facts regarding steel and alloy plate fabrication, and explains many specialized techniques and services in the fabrication of tanks and vessels. *Nooter Corp.*

19 **AIRETOOL TUBE-CLEANING MOTOR.** A two-color, four-page bulletin 49 describes and illustrates the ball-bearing-type tube-cleaning motor and optional cleaner heads for every type of refinery tube cleaning. *Airetool Manufacturing Co.*

20 **VERTICAL PUMPS,** a new loose-leaf pamphlet, illustrates the uses to which the vertical pump may be adapted. Also describes the volatile-liquid pump, suitable for pumping oil, gasoline, kerosine, and other volatile liquids. *Johnston Pump Co.*

21 **TRUCO DIAMOND BITS.** A new catalog of diamond bits, core barrels, and field services includes a short history of diamond drilling, and explanation of the special qualities of diamonds in drilling, types of diamond bits, and estimated costs. *Drilling & Service.*

22 **THE STORY OF SURFACE COATINGS BASED ON VINYLITE RESINS** is a 28-page booklet discussing the essential applications of protective coatings for all types of surfaces. It is illustrated with a wide selection of photographs. *Bakelite Co.*

23 **SURFACE EQUIPMENT.** Over 75 articles of pumping equipment are illustrated or described in this new and comprehensive catalog. *Altens Foundry & Machine Works.*

24 **OIL BURNER CATALOG.** A new condensed, 16-page catalog in color, gives a complete listing, with illustrations, of fully automatic horizontal-rotary type, semiautomatic type, and pressure atomizing type burners. *Ray Oil Burner Co.*

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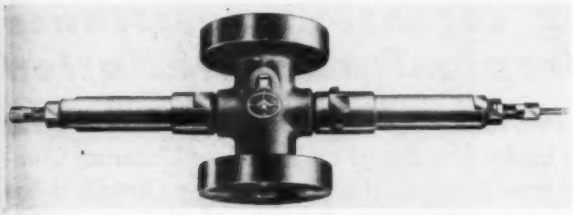
IT'S NEW CHECK IT

by Dan B. Miller

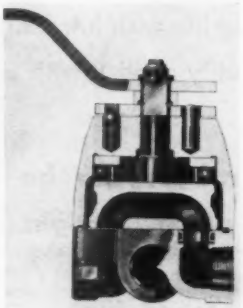
25 FLOW-LINE SAFETY VALVE. A new and simple type of automatic, pressure-operated surface safety valve for high or low-pressure flow lines, combines features of the Otis removable tubing safety valve and



the accurate high and low-pressure pilots of the type X surface safety valve. It utilizes the pressure within the valve bore for energy to close itself, and requires no outside lines for most installations, minimizing danger of hydrates freezing to block action of safety device when its automatic closing is most needed. One feature is the comparative ease with which it may be opened after an automatic closing. Valve consists of a valve body, bored to contain an inner valve assembly, two pilots which are threaded into the body at right angles to the line of flow, and the bypass valve which is opened to equalize pressure across the annular piston area. *Otis Pressure Control, Inc.*

IT'S NEW CHECK IT

26 NEW EXTREME-PRESSURE VALVE DESIGN. A pressure-balanced, self-aligning, tubular valve seat keeps perfect intimate contact with the mating surface of an optically flat porting disk. The rotary movement of this disk opens and closes the flow passages. During the absence of fluid pressure a heavy marcel spring washer maintains the contact between sealing surfaces, while a predetermined hydraulic force acts on the seal under extreme pressure. Fluid flow is always through the hole in the center of the "Shear-Seal," never across sealing surfaces. The wiping and lapping action between the sealing members during each operation actually improves the sealing properties of the valve with use. The service ratings include all common industrial media such as water, air, hydraulic oil, gas, and petroleum. *Barksdale Valves.*



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27 VAPE-SORBER is installed in air or gas lines to instruments and critical pneumatic operations where oily air has detrimental effects. In addition to removing petroleum vapor, the Vape-Sorber removes water, free oil, water-oil emulsion, and dirt. Liquid-impervious ceramic filters operate in conjunction with specially compounded activated carbon to deliver clean air-gas to operating equipment, with no moving parts. *Selas Corp. of America.*

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28 BEECHCRAFT MODEL C35 BONANZA. Takeoff horsepower rating has been increased from 196 hp. at 2,450 r.p.m. to 205 hp. at 2,600 r.p.m., providing better

takeoff performance. The normal horsepower rating has been increased from 165 hp. at 2,050 r.p.m. to 185 hp. at 2,300 r.p.m. The electrically controlled, continuously variable-pitch propeller is all metal. The improved rate

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of climb is evidenced by the increase from 890 to 1,110 ft. per minute at full gross weight. Increased cruising speed is 175 m.p.h. at 8,000 ft.; the recommended maximum cruising speed at 120 hp. or 65 per cent of available power. Top speed is 190 m.p.h. Range figures at 165 m.p.h. at 10,000 ft. are listed as 775 miles on the aircraft's standard 39 gal., 975 miles with an auxiliary 10-gal. tank, and 1,180 miles with an auxiliary 20-gal. tank. *Beech Aircraft Corp.*

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29 WEIGHT INDICATOR AND WIRE-LINE ANCHOR. The type F weight indicator and type F Ideal wire-

line anchor, with a 40,000-lb. dead-line capacity, capable of handling ⅞, 1, 1⅛, and 1¼-in. lines, have recently been developed for use on masts and small rigs. Type F weight indicator provides convenient side mounting for derrick or mast-leg installation; has 12-in. gage dial graduated for 4, 6, 8, and 10 lines; shows net weight on the bit directly in pounds or kilos; has a Vernier weight indicator; is unaffected by temperature and fluid volume changes; and requires no adjustment for cable size or numbers of lines strung. The weight indicator and wire-line anchor combines a snubbing drum having a lever-arm pivotally mounted on Timken bearings. Wire-line pull transmits a rotational force to snubbing drum actuating pressure transformer. Dead-line load is transformed to hydraulic pressure and is transmitted to the gage. *Martin-Decker Corp.*

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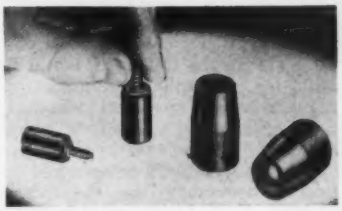
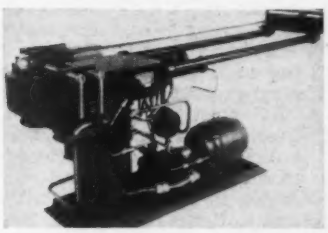
30 MAGNETIC POWER SOCKETS in ¼, ⅜, and ½-in. square drive sizes are especially useful for self-tapping screws. A powerful magnet is imbedded in each socket and holds flat-headed screws firmly. Standard handles and extensions can be used with these sockets. Seven hexagon sizes from ¼ to ½-in. are available in the ¼-in. square drive, four sizes from 5/16 to ½-in. in ⅜-in. square drive, and four sizes from ⅜ to 9/16-in. are ready in ½-in. square drive. *Snap-on Tools Corp.*



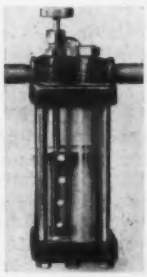
IT'S NEW CHECK IT

31 NO. 800 1¼-IN. HYDRAULIC BENDER is a small compact bending machine with power well beyond its capacity. The unit is powered by a standard 2-hp. 220/440-volt, 3-phase, 60-cycle motor furnished with the machine. Bending die is held on by spring clips, for easy changing. This die is a combination die with four different sizes, one to each side. The bender can be changed simply and easily from a right-hand to a left-hand bender by changing the pressure and clamping arms over and inserting the bolts into holes ready for that purpose. *Wallace Supplies Manufacturing Co.*



IT'S NEW CHECK IT

32 SIGHT FEED BUBBLER controls and visually indicates relatively small rates of flow. Entire flow of gas or air is passed through liquid in a transparent cylinder, where the rate of flow is shown by the bubbles rising through the liquid. Any desired liquid may be used. A needle valve at the top permits selection of any rate of flow from less than 1 bubble per second to approximately 20 cu. ft. per hour. Typical applications include bleeding air into lines to purge them of corrosive fumes, and use with hydrostatic liquid-level gages to control and show the flow of compressed air required for continuous gaging. *King Engineering Corp.*



IT'S NEW CHECK IT

33 SALENTINE VARICYCLE PUMPING UNIT is a long-stroke, hydraulic unit designed for stripper wells. Instead of pumping fluid from the formation in high-speed jerks, it allows fluid to come in from the formation at its own optimum rate under conditions which approach a constant flow. This method is derived

XUM

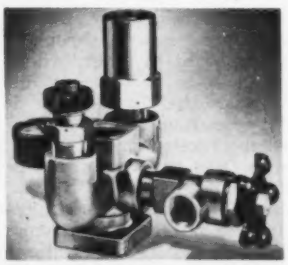
from an arrangement which allows downstroke speed to be varied independently of the upstroke speed. As an example, the optimum plunger speed might be such that the upstroke should be made in 30 seconds. This is set by the power pump speed and displacement. The downstroke, in this case, could be set as low as 2½ seconds by a simple adjustment at the cylinder. This results in a low speed at constant velocity during 90 per cent of the cycle, then a quick drop of the plunger, cushioned at the end by a dashpot. Thus the machine is operating within 10 per cent of constant flow. No foundation is necessary. An A-frame is sufficient to set the unit up. *S. C. Carter Co., Inc.*

IT'S NEW ✓ CHECK IT

34 NEW ELECTRIC CHAIN HOIST. Available in ¼, ½, and 1-ton capacities, this new hoist is equipped with simple rope controls. Designed for hook suspension, it is adjustable for trolley mounting. Constructed of high-strength cast-aluminum alloy with head-treated gearing and high-carbon or alloy-steel ground shafts, the type "JC" hoist is equipped with precision ball bearings. The entire gear train is enclosed in an air-tight case and operates in an oil bath. Relatively light in weight, the unit is easily transported to areas of greatest activity. *Robbins & Myers, Inc.*

IT'S NEW ✓ CHECK IT

35 MULTIPLE VALVE HEAD features a mounting flange which is an integral part of the brass head casting. This feature makes possible flange mounting to the tank. Valves and gages contained in the head can be removed or replaced without disturbing the head mounting. Various combinations of head components are offered, including relief valve, shutoff valve, combination vapor return and excess flow valve, and opening for junior-size float gage. Pressure gage and fixed liquid-level gage are optional. Neoprene gasket and bolts are provided with the head. Benefits claimed are greater protection against leakage, easier servicing, greater safety, simplified installation, and longer head life. *Roney, Inc.*

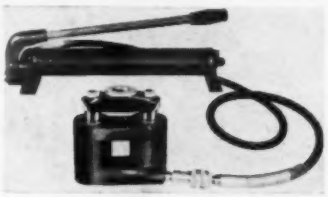


IT'S NEW ✓ CHECK IT

36 MICRO-FINE OIL FILTER CARTRIDGE is a scientific combination of two filtering mediums, virgin cotton and plastic-impregnated wood cellulose. This filter removes solids of micron size, measuring less than 0.0001 in. It holds its own dry weight of acids, dirt, and filings. The thread of the cartridge is machined to fit perfectly on the oil filter base, assuring a vibrationproof, leakproof oil seal. It is especially designed to match the lubrication system of the V-type four-cylinder Wisconsin air-cooled engines. *Wisconsin Motor Corp.*

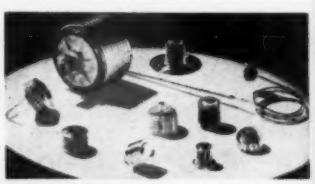
IT'S NEW ✓ CHECK IT

37 POWER-TWIN HYDRAULIC PULLER. Weighing less than 10 lb. and developing 15 tons of power, the Power-Twin has a center hole which makes it quickly and conveniently adaptable to all O.T.C. pulling systems now in use. The Power-Twin is only 5½ in. high and works in any position. The ram travels 2 in., which is adequate for 95 per cent of all the pulling jobs. Remote control pump develops 10,000 psi. and 6 ft. of high-pressure hose allows operator to stand a safe distance from work. *Owatonna Tool Co.*



IT'S NEW ✓ CHECK IT

38 FLEXON BELLOWS are manufactured of brass, stainless steel, bronze, monel, and inconel in single and multiple-ply construction and in various lengths, dependent upon the application requirements. They are specially suited for applications of control devices and instrumentation; such as regulators, valves, steam traps, shaft seals, expansion connections, and flexible connectors for misalignment. Many types of attachments can be provided such as electrical circular seam welding of fittings to stainless-steel bellows to provide unimetal assemblies. Other methods of attachment such as silver brazing and soldering can also be furnished. Charged assemblies can be supplied to customer specifications as required. *Chicago Metal Hose Corp.*



IT'S NEW ✓ CHECK IT

39 ZIRCONIUM METAL. Sheets down to 0.005 in. in thickness, 6 to 7 in. in width, and 2 to 3 ft. in length are available. It is expected that sheets up to 12 to 15-in. width will be available shortly. Rods down to 2-mm. diameter can be supplied and drawn zirconium wire may also shortly be available. Zirconium has excellent resistance to corrosion. Hydrochloric acid and fused alkalis have practically no attack on this metal while its resistance to attack by nitric phosphoric and sulfuric acids is only slightly less than in the case of tantalum. This property renders it very suitable for use in plants where corrosion resistance is required. *Murex, Ltd.*

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- An optional alarm system warns driller of any variations in level.
- Prevents loss of circulation by indicating loss of mud to formations.
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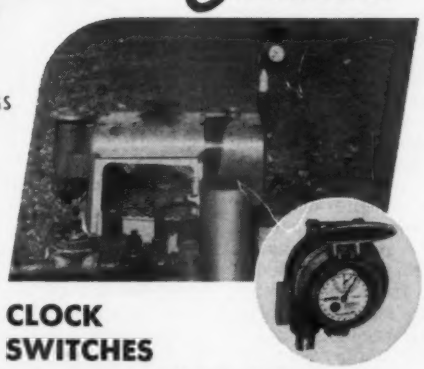

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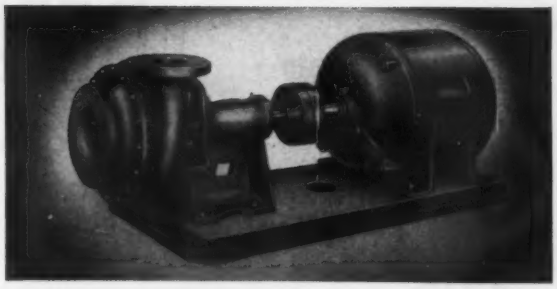

Fig. 3169 single stage, open impeller centrifugal

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REFINING

Orthoflow Cracker

Cat features expansion at Cities Service plant

PONCA CITY, Okla.—Preliminary construction work has been started by M. W. Kellogg Co. at Cities Service Oil Co.'s refinery here on the first Orthoflow fluid catalytic cracking unit to be built in the United States, according to Cities Service.

The new unit is designed to process 11,000 bbl. of charge stock daily. It is a major feature in the refinery's modernization and expansion program which, when completed, will increase the plant's crude-processing capacity approximately 33 per cent to 20,000 bbl. daily.

Other features of the program will be the installation of a catalytic polymerization unit and a gas plant, and revamping and modernizing of the vacuum-flashing unit, and treating processes. A new water-cooling tower will also be constructed.

The Orthoflow cracker, so designated because the catalyst is conveyed in straight pipes rather than in bent or curved ones as in early models of the fluid catalytic cracking process, is only the second of its kind on the American continent.

Heavy oil to be cracked is forced by pumps into the Orthoflow vessel and mixed with hot, finely powdered catalyst, the resulting mixture flowing up the central pipe to the reactor zone.

Heat of the catalyst vaporizes the heavy-oil liquids on contact so that the mixture entering the reactor zone consists of oil vapors and catalyst powder. The powder is separated from the vapors in the reactor and the vapor passes to a distillation tower where it is separated into light gas, gasoline, heating oil, and heavy fuel oil.

As a byproduct of the cracking reaction, a deposit of coke or carbon is formed on the catalyst powder, lowering its efficiency. The powder is then withdrawn from the reactor and passes down the straight pipe to the regenerator. There the coke is burned off, and the temperature of the catalyst is raised to a point high enough to again vaporize the oil feed. Flue gases resulting from combustion of the coke are released to atmosphere through the flue-gas stack.

Octane Numbers Studied

NEW YORK.—A proposal calling for discontinuance of the use of motor octane numbers in American Society for Testing Materials specifications for motor gasoline and the substitution of research numbers is being considered by A.S.T.M. Committee D-2 on petroleum products and lubricants.

The proposal arises due to considerable thinking among both consumers and producers of motor fuels that research octane numbers are more significant than motor octane numbers.

The motor method has been used in A.S.T.M. specifications for gasoline since 1937, while the research numbers were adopted tentatively in 1947. Since 1947, the research system has become increasingly popular.

Before making a recommendation, Committee D-2 is soliciting opinions of consumers and producers on the subject. Communications should be addressed to W. T. Gunn, secretary, A.S.T.M. Committee D-2, Room 2040, 50 West Fiftieth Street, New York 20, N. Y.

T.C.C. Units Completed

BUFFALO. — Socony-Vacuum Oil Co., Inc., has commenced initial operation of a new 15,000-bbl. per day airlift Thermofor catalytic cracking unit at the Atlas works, Buffalo, N. Y. The unit replaces a 10,000 bbl. per day fixed bed Houdry unit. At the same time, Magnolia Petroleum Co. completed a third similar unit at its Beaumont, Tex., refinery. This brings to seven the total of T.C.C. units now completed, including three at Beaumont, one at Buffalo, one at Trenton, Mich., and two units at Standard Oil Co. of Ohio's Cleveland refinery.

Socony-Vacuum has four more under construction in this country, five other oil companies have contracted for additional domestic units, and further units are being installed in Italy, France, and Germany.

Alkylate Output Increased

BORGER, Tex.—The hydrofluoric acid alkylation unit at Phillips Petroleum Co.'s refinery here set a new plant-production record in December 1950 of 5,570 bbl. per day of debutanized total alkylate in an effort to help meet the emergency demand for fighter-grade aviation gasoline.

The Borger unit, in operation since December 1942, is the first operating unit to use hydrofluoric acid as an alkylation catalyst.

The 5,570 bbl. figure was more than 300 per cent of the production for which the plant was designed, and the record output necessitated the importing of a high percentage of feed stocks from sources outside the refinery, some more than 500 miles away, Phillips said.

It also required the use of secondary

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feed stocks, such as propylene and catalytic polymer gasoline, and special operating conditions, such as lower isobutane-olefin ratio, higher reactor temperatures, and lower purity of recycle isobutane. All of which cause a net lowering of the alkylate rating. The drop in rating was offset by use of special blending ingredients in final fighter-grade aviation blends.

In order to attain the increased alkylate production, the company enlarged the feed driers, added another contactor, installed a larger depropanizer to allow greater use of propylene for feed stock, enlarged acid-rerun facilities, and improved control by use of continuous-recording infrared isobutane analyzers.

Company Changes Name

TEXAS CITY, Tex.—Petrol Refining, Inc., has changed its name to Texas City Refining Co., it has been announced by William Fetter, general plant manager.

The change was made to avoid confusion with other products which bear the name Petrol, Fetter said.

The plant here, which is being reactivated after a 15-month shutdown, is expected to go into full-scale production of high-octane gasoline for the Armed Forces soon.

Work has been progressing on the reactivation of a Houdry fixed-bed catalyst plant and an HF alkylation unit.

The refinery will make 100 and 130-octane avgas, 86 and 92-octane motor fuel, kerosine, No. 2 fuel oil, diesel oil, Bunker "C," and some isobutane.

Refining Briefs

Union Oil Co. is considering the installation of new asphalt-manufacturing facilities at its Los Angeles refinery. The company is already building a plant to process 4,000 bbl. per day of crude at Edmonds, Wash., and is improving asphalt facilities at its Oleum refinery.

Oriental Refining Co., of Denver, has begun construction of a 1,500-bbl. per day Cycloversion unit. The unit has been designed to desulfurize straightrun or thermal-cracked gasoline stocks, or to reform straightrun gasoline.

Gladewater Refining Co., Gladewater, Tex., recently completed a modernization and expansion program at its refinery which included the installation of a Cycloversion unit with a design capacity of 600 bbl. per stream day. The unit, engineered and constructed by Grebe & Doremus Process Co., Houston, will reform straightrun gasoline and desulfurize cracked stocks.

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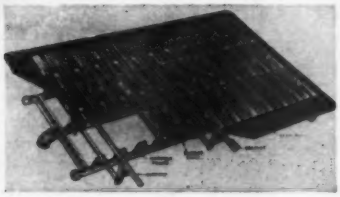

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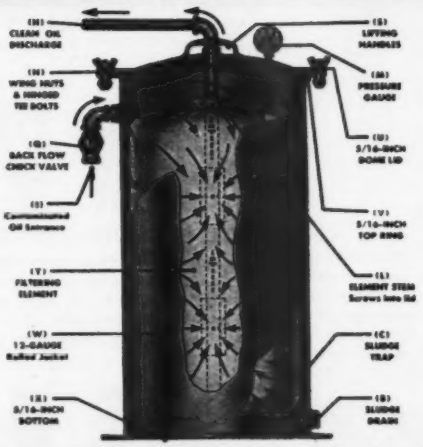
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(I) LIFTING HANDLES
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(M) PRESSURE GAUGE
(G) BACK FLOW CHECK VALVE
(O) 5/16-INCH DOME LID
(J) Contaminated Oil Entrance
(V) 5/16-INCH TOP RING
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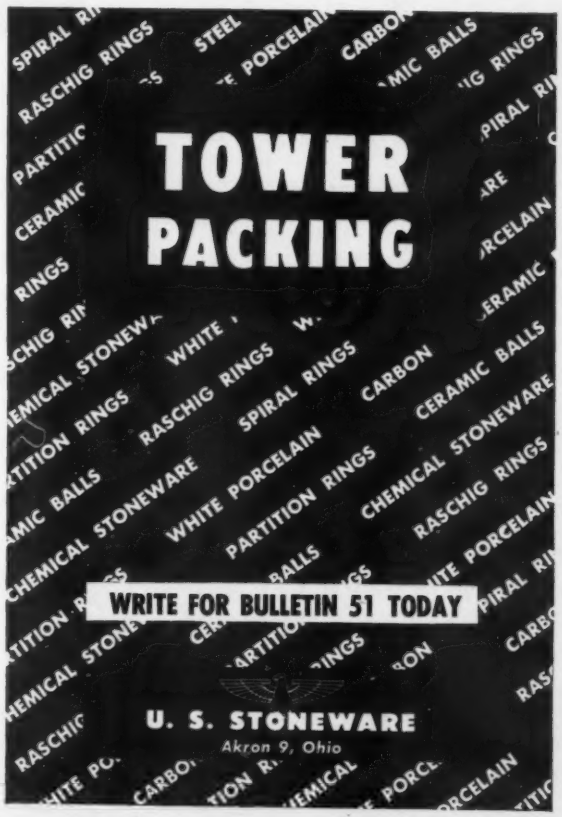

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...is unequalled for all-around pressure control because it combines—in *one* compact unit—the many features needed for safe, simplified drilling under pressure. What's more, no special drill pipe or kellys are required—*it works equally well with all standard drill-string hook-ups!*

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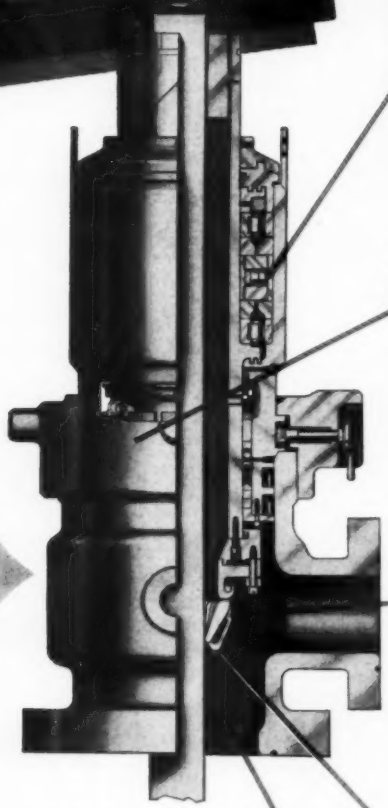
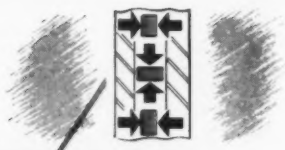
Check over the unique features outlined at right. Then, before you purchase *any* pressure control equipment, get the *complete* story on the Shaffer Combination Rotating Blowout Preventer and Stripper. It's the most *efficient*, most *positive*, most *versatile* pressure control unit available today!





UNUSUALLY LONG LIFE

The Stripper Assembly rotates freely *with* the kelly—not one inside the other—thus, there is virtually no wear on the rubber. This reduces maintenance, assures a pressure-tight seal and maximum safety. In addition, the bearing assembly upon which the unit rotates has separate thrust and radial bearings to withstand any combination of loads due to high pressures and high-speed drilling. Bearings are lifetime prepacked with heat-resisting lubricant.

QUICK RELEASE

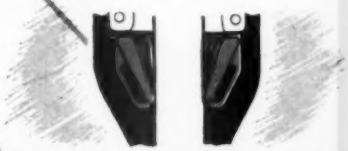
Bits and reamers can be passed through the unit with maximum ease, safety and simplicity. Simply pull a spring latch, rotate the bonnet 1/6 turn and the entire internal mechanism as a unit can be withdrawn to permit removal of the bit or reamer. When going back into the hole, simply reverse the operation. It's as simple as that!

SEALS ANY SHAPE, VARYING DIAMETERS

The Stripper Rubber expands and contracts *automatically* to fit the various shapes and diameters in the drill string (excepting only such abnormally large diameters as the bit and reamer). It seals off around any shape—square, hexagonal and octagonal kellys... as well as the varying diameters of couplings, tool joints, subs, drill collars and pipe, whether upset, flush or coupled. *No manual adjustment is necessary!*

AMAZING COMPACTNESS

Space-saving compactness of the Shaffer Combination Rotating Blowout Preventer and Stripper reduces both vertical and horizontal space requirements, and permits installation even under the most difficult space limitations. Even the flow connections are built directly into the body, thus simplifying hook-ups and eliminating need for spools or other equipment for overflow connections!



STEEL PROTECTED STRIPPER RUBBER

A patented expandable steel barrier of flexible steel latches prevents the Stripper Rubber from extruding either by high pressure or by pulling large diameters through it. Yet full flexure of the rubber is assured at all times!

SEALS CONTINUOUSLY

A pressure-tight seal is maintained at all times without need for applying mechanical or hydraulic pressure of any kind from the outside... and the seal is *self-adjusting* to the varying shapes and sizes in the drill string. The operator can *drill* under pressure, and can also *strip* pipe in and out of the well under pressure—all *without adjustments or changes in the unit!*

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See pages 4433 to 4496 of your 1950 Composite Catalog for helpful data on Shaffer products. Or send for your free copy of the 1950 Shaffer Catalog!

XUM

Among the Drilling Contractors

Drilling Group Makes Progress in Research

Satisfactory progress in carrying on its research program was reported to stockholders of the Drilling Research, Inc., at their recent annual meeting. The company has completed the second year of a 3-year program under the present stockholders' agreement. There are 40 stockholders consisting of oil and drilling companies, and also two licensees.

At the time the research company was organized it was explained its objectives were "to seek a lower cost means for sinking holes in the earth than is represented by present methods for drilling oil and gas wells." So far, the research work has been carried on in two directions, one labeled "vibration" drilling and the other "electric arc" drilling. It is explained these names are more for convenience to describe an area of research than they are necessarily descriptive of the particular path of development.

The research company, during 1950, had research contracts or consultantships with the following: Battelle Memorial Institute, Columbus, Ohio; Dr. A. M. Freudenthal, Columbia University; A. F. Birch, Harvard University; J. P. Den Hartog, Massachusetts Institute of Technology; W. Prager, Brown University; L. O. Grondahl, Pittsburgh, Pa., and T. M. Jasper, Milwaukee, Wis.

At the annual meeting all officers were re-elected. J. J. Reynolds replaced H. H. Hinson on the technical advisory committee. The officers are: C. P. Dimit, president; A. E. Chester and E. D. Wallace, vice presidents, and H. H. Kaveler, secretary-treasurer. The executive committee consists of P. H. Bohart, A. E. Chester, R. B. Kelly, J. E. Brantly, C. P. Dimit, M. J. Kirwan, J. E. Rouse, R. S. McFarland, and J. E. Roth.

Milton Crowe, Inc., Shreveport, has a rig working on a contract with Carter Oil Co. for a 6,500-ft. lower Tuscaloosa sand test in Madison County, Mississippi. The test is 1 Crawford. Location is in 7-7n-2e, about 9 miles northeast of Jackson.

Greeley Drilling Co., Inc., Wichita, is drilling on a contract with Robert L. Williams for a wildcat test located southwest of the recently opened Four Mile Creek pool in southwestern Butler County, Kansas. Specific location is in the NW NE NE 7-28-3e, on the Chance lease. **Sunflower Drilling Co.,** Grifley, Kans., is the contractor on another recently started test in the same general area. This operation is for J. C. Dozier at 1 Martin, NW NW SE 8-28-3e.

Penn Drilling Co., Shawnee, Okla., is starting another well for Sterling Oil Co. of Oklahoma, Inc., in the East Wetumka district of Hughes County, Oklahoma, where the operator last month opened Cromwell sand production. The new operation is a north offset to the Cromwell discovery well, which found the pay at 2,980-3,003 ft. It is 2 Meadows, located in the NE NE NW 18-9n-11e.

Stearns Drilling Co., Russell, Kans. has a rig working for Musgrove Petroleum Corp. on a wildcat location ½ mile south of Woodruff, in northern Phillips County, Kansas. The location is in the SE SW NE 11-1-19. It is 2 miles southwest of the Dry Creek pool and 3 miles northwest of the Artz pool.

Casner & Bentz, Oildale, Calif., have a rig working for Los Nietos Oil Co. in the Chowchilla area, in Madera County, California. The present operation is at 22 Chowchilla Farms, in 29-10s-14e.

Harley Turpin, Holdenville, Okla., cable-tool contractor, is starting a 1,500-ft. well for Leo J. Portman of Oklahoma City in the East McAlester gas area, Pittsburgh County, Oklahoma. It is 1 Southard, C SW NE 34-6n-15e.

Mid-Union Drilling Corp., Gainesville, Tex., is drilling for Wasoff & Mullarkey at 1 Brown, a wildcat test in the J. G. Lawrence Survey, 3½ miles southeast of Jacksboro, Jack County, North Texas.

Austin-Dunham, Inc., has moved a rig to a wildcat location in northern Kay County, Oklahoma, where it has a contract for a 3,200-ft. Bartlesville sand test to be drilled for Dean Witter of San Francisco.

K & E Drilling, Inc., Wichita, will drill for Imperial Petroleum Co. at 1 Ward, a wildcat test in the NE NE SE 15-23-13, 3 miles northeast of St. John, Stafford County, Kansas.

Hayes & Sprague, Inc., Los Angeles, is the contractor on a wildcat location being drilled by Richfield Oil Co. at 1-A Mettler, 13-10n-25w, in the Cuyama Valley area, San Luis Obispo

The man on the rig knows that for a tight seal and easy separation of parts you can't beat 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

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County, California. Stansbury, Inc., Bakersfield, is drilling Richfield's 3-A DeKoch, another wildcat in the same general area.

Newton Barrett Drilling Co., Shawnee, Okla., is drilling on a contract with Oklahoma Natural Gas Co. at 1 Lesh, SE SE NW 7-17n-2w, a wildcat location 6 miles north of Guthrie, Logan County, Oklahoma.

Delaware Drillers, Inc., San Angelo, Tex., has the contract on a Swastika sand wildcat test (1 Steffey) being drilled for Elm Oil Co. and Lloyd Davidson in the area about 2 miles north of Robert Lee, in Coke County, Texas. Contract is for 4,500 ft.

Peterson Drilling Co., New Orleans, is undertaking another wildcat venture for its own account. It is a Wilcox sand test in the area 3½ miles northeast of Lessly, in Wilkinson County, Mississippi. Location is on the company's McKellar lease in the C NW NE 36-3n-3w. Projected depth is 8,400 ft.

Whiteley Drilling Co. has a contract for a Bacon limestone test to be drilled for Eugene Talbert in the northeast extension area of the Hamm-Gossett field, Kaufman County, eastern Texas. The test, 1 Tuggle, is projected to 6,700 ft.

Aggas Drilling Co., Morris, Okla. has a well-deepening job under way for W. H. Pine at 1 Busby, SW SE NW 12-4n-8e, a wildcat location southeast of the Allen pool, Pontotoc County, Oklahoma. The hole had been drilled last year by the former Barnsdall Oil Co. to 5,810 ft. in the basal McLish zone, where it had been abandoned.

Sharp Drilling Co., Midland, Tex. has contracted with Standard Oil Co. of Texas for a 10,000-ft. wildcat test, 1 Flynn, located about 2½ miles northwest of the Cravens field, in north central Lubbock County, West Texas.

ROTARY RIGS IN OPERATION*

(United States and Western Canada)

Area—	Week ended 3-5-51	Change week ended 2-26-51	Change week ended 3-6-50
Gulf Coast	507	—13	+ 22
W. Tex.-N. M.	789	+30	+ 82
Ark.-N. La.-E. Tex.	128	— 1	— 19
Oklahoma	279	+36	+ 31
Kansas-Nebraska	125	0	+ 8
Illinois-Eastern	23	— 8	— 47
Rocky Mountains	108	+ 6	+ 44
Pacific Coast	138	+ 3	+ 4
Total United States	2,097	+53	+135
Western Canada	105	— 5	+ 25
Total	2,202	+48	+160

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown by charts on pages 142 and 143.

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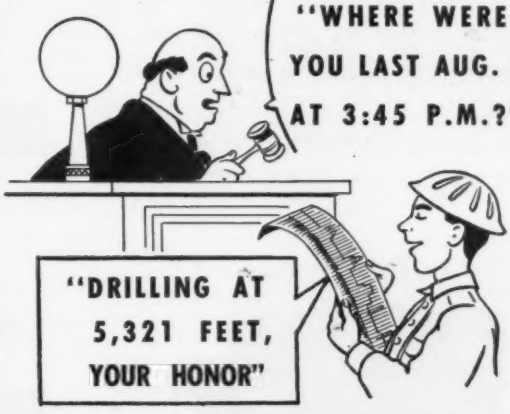

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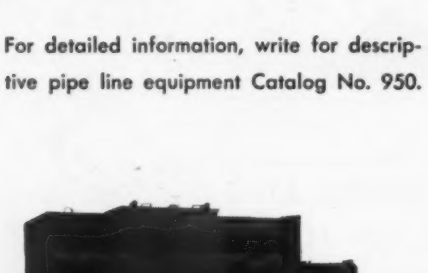
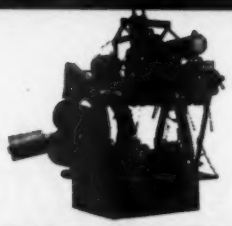
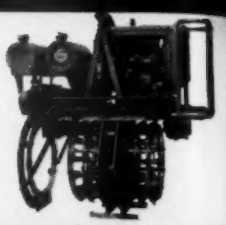


CROSE-LITTLEFORD 30-BARREL PIPE COATING KETTLE

These kettles are also available in both 23-barrel and 10-barrel capacities.

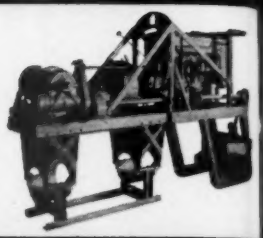


CROSE 22" - 26" Line-Traveling COATING and WRAPPING MACHINE

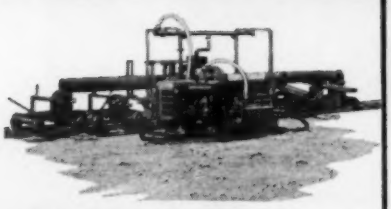


CROSE Model "K" PIPE CLEANING and PRIMING MACHINE

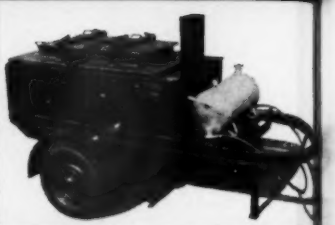
CROSE PIPE CUTTING and BEVELING MACHINE



CROSE Auger-Type ROAD BORING MACHINE



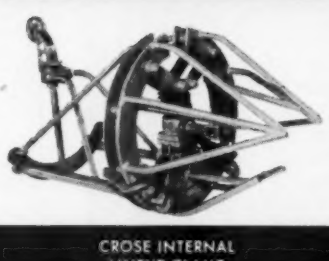
CROSE STATIONARY COATING and WRAPPING MACHINE



CROSE-LITTLEFORD 225-Gallon PATCH KETTLE

CROSE PIPE CRADLE

CROSE ENDLESS PIPE BELT SLING



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PIPE LINES

ICC Report

Companies moved more oil for more revenue in 1950

WASHINGTON.—Fifty pipe-line companies reporting to the Interstate Commerce Commission handled 2,681,574,189 bbl. of oil last year, an increase of 300,000,000 bbl. over the 2,381,809,548 bbl. handled in 1949, it was disclosed last week in statistics compiled by the commission.

The 50 companies are those having annual operating revenues of more than $500,000, and the ICC compilation showed that while 11 of them reported declines the group as a whole had a 17.3 per cent increase in transportation revenue, which amounted to $409,458,402 in 1950 against $349,005,607 the previous year.

Humble moves most oil.—The ICC reported that Humble Pipe Line Co. reported 240,819,256 bbl. handled in 1950 against 223,807,065 bbl. in 1949 with a transportation revenue last year of $33,944,380, up 12 per cent over the previous year; Texas Pipe Line Co. delivered out of system 169,129,453 bbl. against 143,794,734 bbl. and had a revenue of $23,553,488, up 37.4 per cent; Interstate Oil Pipe Line Co. moved 168,619,800 bbl. against 161,262,707 with a revenue of $20,332,187, up 9.6 per cent; Buckeye Pipe Line Co. handled 157,170,127 bbl. against 144,305,511 with a revenue of $8,076,076, up 13.1 per cent; Magnolia Pipe Line Co. handled 156,554,495 bbl. against 127,101,944 bbl. with a revenue of $29,712,754, up 25.3 per cent.

Service nets most revenue.—Service Pipe Line Co. (formerly Stanolind Pipe Line Co.) reported 153,680,749 bbl. against 140,599,969 bbl. with a revenue of $47,777,018, up 24.2 per cent; Gulf Refining Co. reported 152,340,641 bbl. against 135,521,001 bbl. with a revenue of $26,899,142, up 15.1 per cent; Sinclair Refining Co. handled 133,276,012 bbl. against 116,642,429 bbl. with a revenue of $31,490,578, up 13.8 per cent; Ohio Oil Co. moved 128,824,125 bbl. against 116,544,318 bbl. with a revenue of $13,098,451, up 11.5 per cent, and Shell Pipe Line Corp. moved 116,699,159 bbl. against 105,811,247 bbl. with a revenue of $23,187,665, up 14 per cent.

Shell Buys Field System

HOUSTON.—Shell Pipe Line Corp. has announced that arrangements has been made to purchase the crude-oil gathering system in Pardue field, Fisher County, Texas, from Humble Pipe Line Co.

The field will be connected with the 10-in. McCamey, Tex.-Cushing, Okla., trunk line by a new 5-mile, 4-in. lateral line to be constructed to Hamlin station. Pardue field has been under active development for the past year and is at present producing about 2,000 bbl. daily.

In addition, Shell will construct a gathering system in East Hamlin field, Jones County, and connect it with Hamlin station. Crude from East Hamlin field, also under active development for the past year, is now being trucked by producers to Hamlin station. Shell will construct 9 miles of 4-in. line to transport the daily production of about 2,500 bbl. to the main line. Shell Oil Corp. is already buying crude from East Hamlin field; it will commence buying Pardue crude as soon as Shell Pipe Line is ready to gather it.

The new gathering and lateral lines for Pardue are expected to be in operation on March 1, and those for East Hamlin on April 1.

New Line Markers in Use

BARTLESVILLE, Okla.—Cities Service Pipe Line Co. has launched a program which it hopes will facilitate detection and repair of breaks on its main lines.

Every road crossing and angle point on the company's main lines now has a new marker to serve as a location guide to the flying pipe-line patrolman, and secondarily to serve as a warning sign to road construction and repair crews.

On one side of each marker are four interchangeable porcelain - enameled plates designating the mile-post number. Numerals are black on an orange background, which has been found to be the color combination most easily visible from the air. The numerals are designed sufficiently large to be legible from a plane flying at 500 ft.

When the flying patrolman spots a leak, he reports it by the mile-post number. Maintenance crews also use the numbers as reference points.

On the reverse side of the marker is carried the corporate name and the warning, "Danger—high-pressure oil line," in bright red on a green background. The warning is expected to reduce line breaks caused by ditching machines and other highway equipment.

Framework of the marker is of welded angle iron attached to an 8-ft. length of 2-in. pipe. Both sides are set at a 45° angle to provide the greatest visibility from both ground and air levels.

18 YEARS'

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Firm Coats, Wraps 4,000 Miles of Pipe in 5 Years

DURING its 5 years of operations, Tulsa Pipe Coating Co., a partnership of Gaines Laster and Ivan L. (Brownie) Brunkow, has coated and wrapped more than 4,000 miles of pipe. This work has been fairly evenly divided between over-the-ditch and yard contracts.

Prior to organizing the company, both partners had extensive early experience with contractors, pipe-line companies and coating manufacturers.

History.—Laster began pipelining in 1928 with Smith Brothers under C. S. Foreman. He was superintendent

I. L. BRUNKOW

GAINES LASTER

during the laying of a Texas Co. line near Rankin, Tex. During the next 10 years he was employed by several pipe-line contractors. He worked at various gang jobs and in supervisory capacities in spite of the handicap of an injury resulting from an accident in a coal mine when he was 19 years old. In 1937 he was coating inspector for Panhandle Eastern Pipe Line Co. For the next 9 years he was with the Barrett pipe-coating organization, first as service inspector, later general superintendent in charge of service, and finally sales manager in the Mid-Continent area.

Brunkow's pipe-line experience started with Smith Brothers contract with Missouri Valley system, now Northern Natural Gas Co., for laying a Washington, Kans.-Council Bluffs, Iowa, line section. He also worked on laying the Mullinsville-Clifton, Kans., section of this system, part of which is now being taken up and coated by Tulsa Pipe Coating Co., 20 years later. In 1939 and 1940 he worked on a C. S. Foreman Co. contract for Northern Natural in Iowa and Kansas. He was inspector for Natural Gas Pipeline Co. of America in Illinois before he and Laster became

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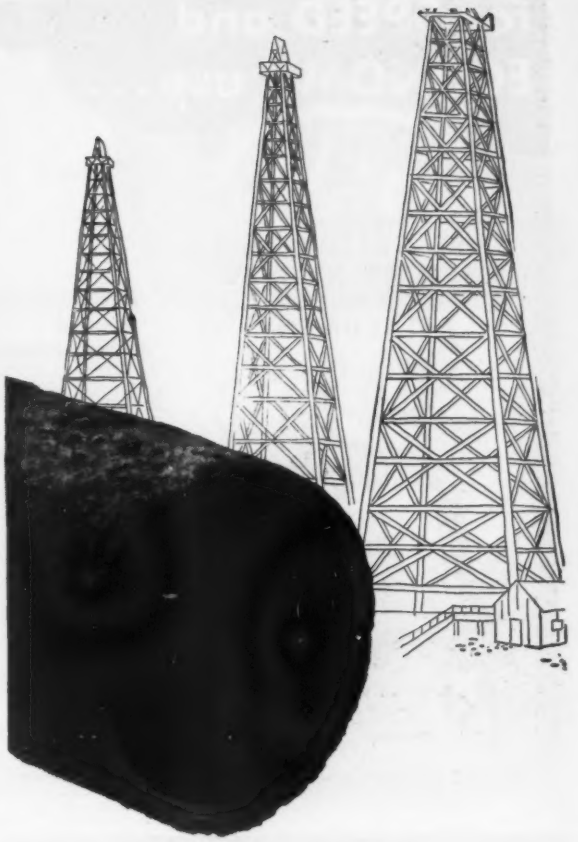

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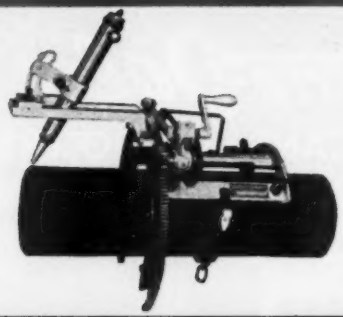
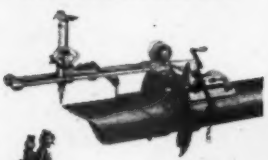


ATTACHMENTS



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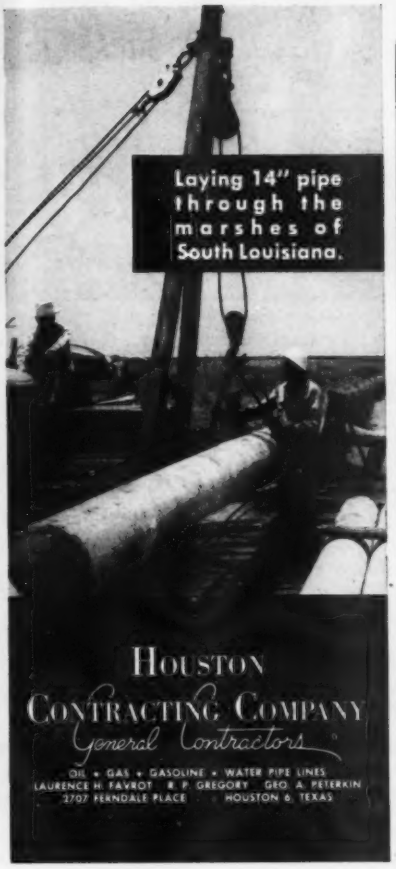

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engaged in operations for interior and exterior coating of a 138-mile line for the Navy. Brunkow was inspector for the Navy until 1943 when he was service man for 4 years first for Barrett and later for Wailes-Dove-Hermiston.

Recent work. — Recent coating and wrapping work has been done for: Shell Pipe Line Corp., 165 miles, 10-in., Cushing, Okla.; Sinclair Refining Co., 185 miles, 8-in., Shawnee, Okla.,-Grand Prairie, Tex.; Great Lakes Pipe Line Co., 75 miles, 12-in., Des Moines; Plains Natural Gas Co., 300 miles of various diameters, Hugoton area of Kansas and Oklahoma; Oklahoma Natural Gas Co., 53 miles, 26-in., Depew-Edmond, Okla., and 45 miles, 16-in., Velma, Okla.

Personnel.—The Tulsa Pipe Coating Co.'s main plant, warehouse, and office are at Apache and North Lewis Avenue in Tulsa, L. S. (Buck) Rogers, is general superintendent. Superintendents and locations of other coating plants are as follows: Elvin Lair, Tulsa; Lloyd Latham, Oklahoma City; Wayne Elgin, Kansas City; K. C. Honn, Hugoton, Kans.; and Hamilton Dubose, Hooker, Okla.

Montana-Dakota to Expand

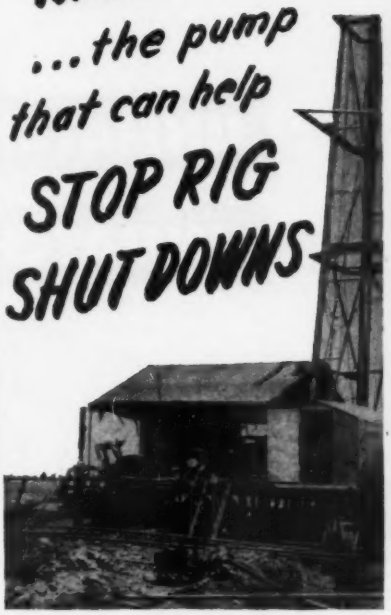
WASHINGTON.— Montana-Dakota Utilities Co. has asked authorization of the Federal Power Commission to acquire all of the operating properties and the Elk Basin Cloverly gas reservoir of the Billings (Mont.) Gas Co.; to purchase that portion of the operating properties of Rocky Mountain Gas Co., of Casper, Wyo.; and to purchase all of the capital stock of Big Horn Gas Co., of Basin, Wyo.

The facilities to be purchased from Billings include a desulfurization and dehydration plant, a compressor station, and an 88-mile pipe line.

The Rocky Mountain Gas Co. properties include 41 miles of line and a spur line. The Big Horn properties consist principally of a line extending from the Little Buffalo Basin field in Hot Springs County, Wyoming, to Basin and Greybull, Wyo., together with branch lines to Worland, Wyo., and to Grass Creek field in Hot Springs County.

Montana-Dakota plans to interconnect these facilities with pipe line owned by Montana-Wyoming Gas Pipe Line Co. and operated by Montana-Dakota. In addition, two 880-hp. compressor units and other necessary equipment would be added to the Worland (Wyo.) compressor station. These facilities are to be built and owned by Montana-Wyoming and operated by Montana-Dakota under lease. Montana-Dakota would build a compressor station consisting of two 330-hp. units together with dehydration facilities in Little Buffalo Basin field.

Marlow "MUD HOG" ...the pump that can help STOP RIG SHUT DOWNS



With this famous diaphragm pump on the job you don't need to shut down your rig to clean cuttings from pits, mix muds or pump water. What's more, your slush pump is free to stay on its profit-producing job — circulating drilling mud.

At your rig a Marlow "Mud Hog" can:

Eliminate jets to clean pits
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Mix mud and feed slush pump directly . . . eliminate unused mud at slush pump suction
Transfer water from waste pit
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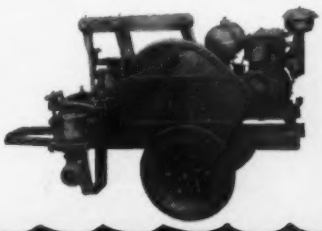
A Marlow "Mud Hog" is the unrivalled "tough baby" of the oil country. Write for complete details about this dependable money-saving pump.



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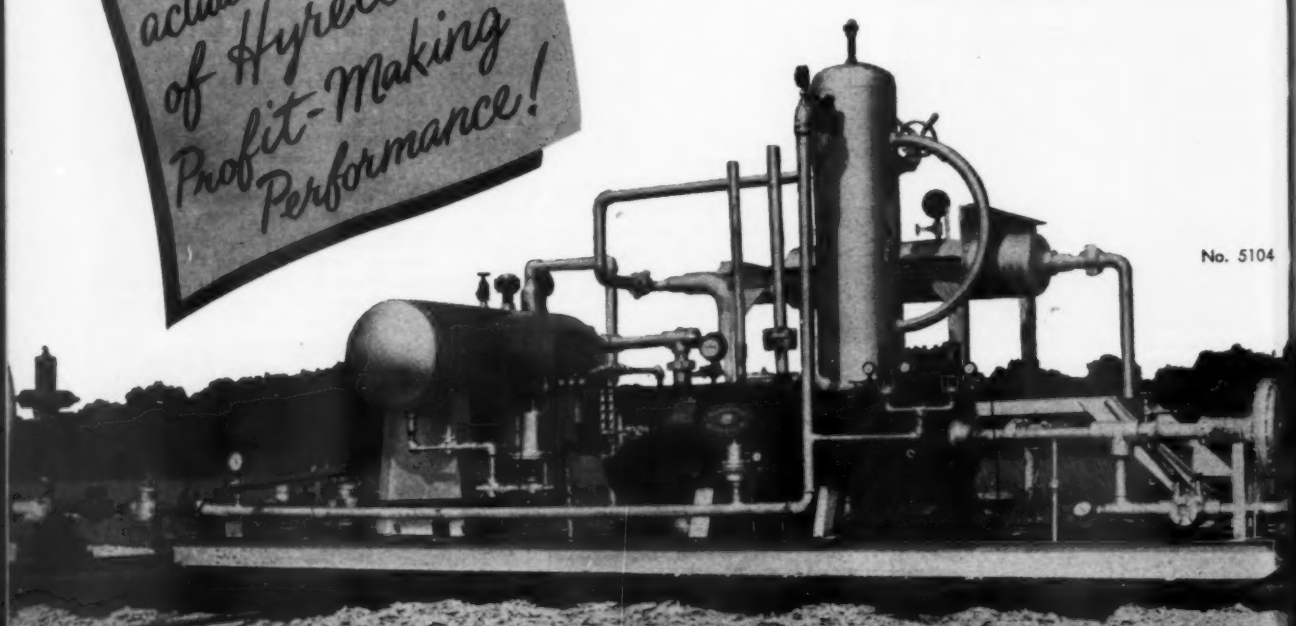

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NATURAL GAS

Natural-Gas Course

D. D. Katz to lecture on engineering at Kansas U.

LAWRENCE, Kans. — A 2-day refresher course in natural-gas engineering featuring a lecture series by Dr. Donald D. Katz, natural-gas authority from University of Michigan, is scheduled for March 26-27 at University of Kansas.

The conference, as well as serving as a refresher course, will be held to present new ideas and methods of value to engineering personnel.

Major topics.—Lectures will concern four major engineering aspects: (1) Physical and Thermodynamic Properties of Natural Gas; (2) Flow of Natural Gas in Pipes; (3) Flow of Gas in Reservoir; and (4) Prediction of Gas Reserves.

Subtopics under the main headings will include: density-compressibility factor; viscosity; gas-water equilibrium; hydrate-liquid water-gas equilibrium; enthalpy-entropy diagrams; static gradients in wells; gas measurement; compression-enthalpy entropy diagrams; transmission calculations; prediction of hydrate formations upon expansion; back pressure and deliverability tests; theoretical radial flow in steady state.

Unsteady-state flow in low-permeability reservoirs; effect of "draw down" on deliverability; pore volume from geological data; laboratory data on cores; sample-grading method; connate water; reserves calculations; gas in place by material balance; assumptions in method; correction for nonequilibrium in reservoir pressures; and reserves available for pipe line.

The program is arranged to give maximum benefit to those concerned with production and transportation of natural gas in the Mid-Continent area.

Sponsors.—The course is sponsored jointly by the petroleum-engineering department of University of Kansas, Kansas Board of Health, Kansas Section of American Institute of Mining and Metallurgical Engineers, Kansas Geological Survey, and University of Kansas Extension.

Enrollment blanks may be secured from E. A. McFarland, manager, University of Kansas Extension, Lawrence, Kans.

United Gas Corp. Expands

SHREVEPORT.—United Gas Corp. has reported that company sales of natural gas increased more than 85 billion cubic feet last year to total 596 billion cubic feet.

Natural-gas service was extended to 19 additional communities in Texas, Louisiana, and Mississippi, and more than 30,000 customers added to service lists in towns already served by the company. United now serves 439 cities and towns.

Expenses during the year continued the upward trend to show an increase of $12,000,000 over those for 1949. Nearly $41,000,000 was invested in 1950 in capital expenditures for construction, development, and replacements. About $21,000,000 went into pipe-line properties, $10,000,000 in production properties, and $6,000,000 in distribution properties.

United Gas Pipe Line Co., a subsidiary of United Gas Corp., and the world's largest natural-gas pipe-line company in terms of maximum-daily-delivery capacity, plans a huge construction and expansion program for 1951. The project, one of the largest ever authorized by the Federal Power Commission, includes 1,000 miles of pipe lines in Texas, Louisiana, and Mississippi to be constructed at a cost estimated at $111,000,000. *(The Oil and Gas Journal, March 8, 1951, page 49).*

Storage Capacity Grows

COLUMBUS.—Ohio Fuel Gas Co.'s underground-storage program, initiated in 1933 to replace gas from depleted Ohio fields with out-of-state gas, has grown from a modest 33,000,000 cu. ft. in that year to a capacity of 53,000,000,000 cu. ft. in four storage areas as of last fall.

As a part of a $60,000,000 expansion program during the last 5 years, Ohio Fuel has built a new pipe-line-transmission system connecting those four storage areas with its markets.

If present plans can be carried out as indicated, the company will invest an additional $20,500,000 this year to provide further improvements in service.

The volume of gas handled per year by Ohio Fuel now stands at 131,000,000,000 cu. ft., which is served to more than 500,000 retail customers in 359 Ohio cities and towns. Another 350,000 customers in 24 wholesale markets are supplied by the company.

High Texas Gas Price Set

HOUSTON. — Sale of natural gas produced from Woodlawn field, Harrison County, East Texas, to Mississippi River Fuel Corp., St. Louis, has been announced by officials of Stanolind Oil & Gas Co. and Continental Oil Co., major developers of the field.

Terms of the sale, subject to final contract arrangements, call for a beginning price of 12 cents per thousand cubic feet, a new high price for natural gas in Texas. The contract will run 20 years from date of signing. Stanolind and Continental have reserved the right to cycle the gas to any extent desired, depending upon future performance of the field, and to build a processing plant in the field at any time.

At present, there are 19 completed wells and several more active drilling locations in the field. Mississippi River Fuel is reported to be negotiating also with Hollandsworth Oil Co., Longview, Tex., and Rogers Lacy, Inc., which have production in the area.

An official of Mississippi River Fuel said the company plans to lay 80 miles of pipe line to transport the gas to Perryville, La., from a terminus near Woodlawn.

Lion to Build New Plant

EL DORADO, Ark.—Contracts have been let by Lion Oil Co. for construction of a new plant near Magnolia, Ark., to extract sulfur from natural gas.

The plant, to produce about 10 tons daily, will be located on the site now occupied by Lion's gas-compressing and cleaning plant near Magnolia. Lion will manufacture the sulfur from waste hydrocarbon sulfide gases removed during the cleaning of about 12,000,000 cu. ft. per day of sour residue gas. The hydrogen sulfide formerly had been burned.

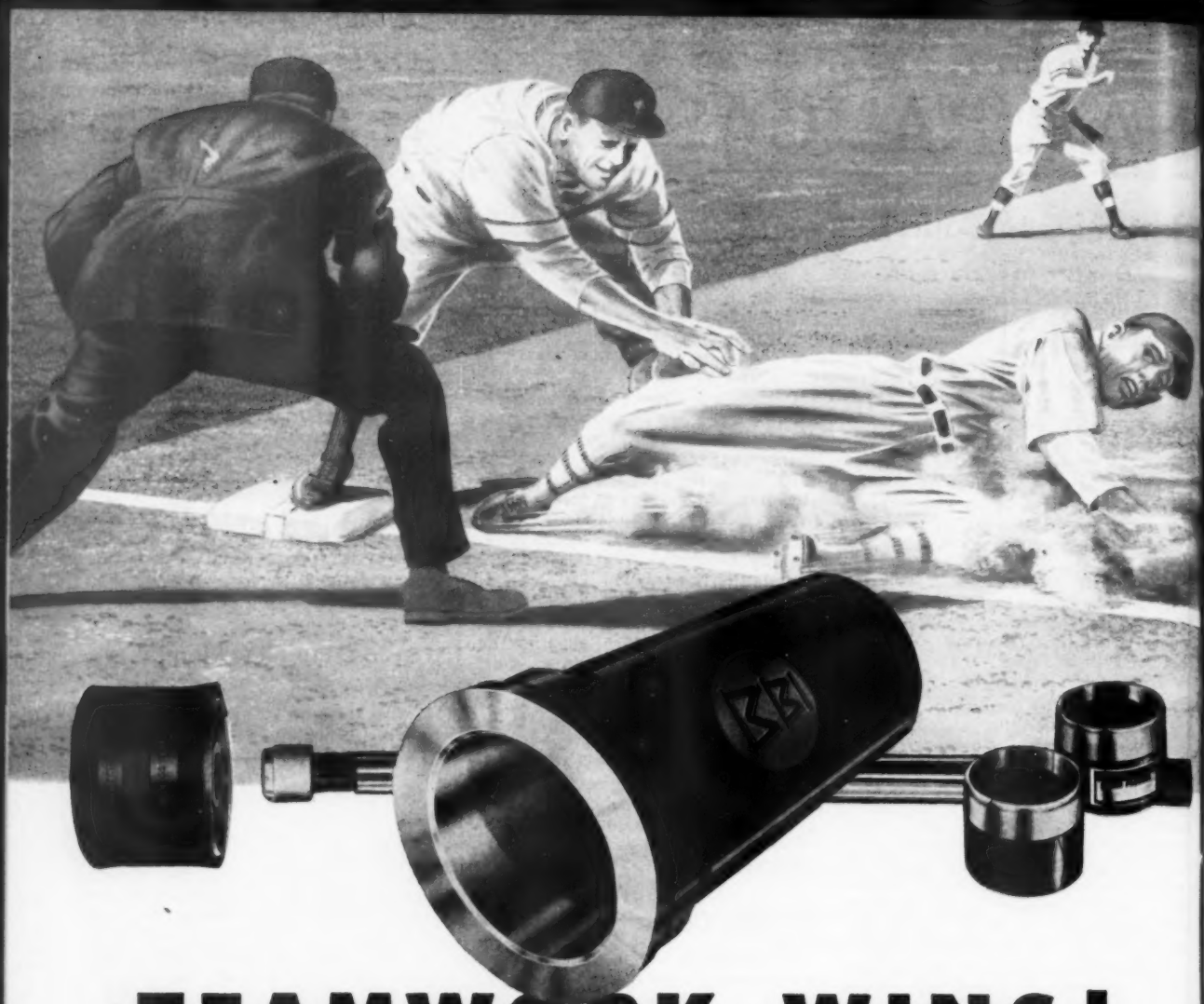
El Paso Line Progresses

FARMINGTON, N. M. — Natural gas from the San Juan basin area of New Mexico, Nevada, and Utah will start flowing through El Paso Natural Gas Co.'s pipe line to Topock, Ariz., before the first of May, according to R. W. Harris, pipe-line-construction superintendent for El Paso. Fewer than 120 miles of the 451-mile, 24-in. main line remains to be laid and completed, he said.

Construction crews are laying 8-16-in. gathering lines from Barker Dome to the north of Kutz Canyon and Angel Peak fields to the south.

The main line will connect at Topock with a 36-in. line, owned by Pacific Gas & Electric Co., which will carry the San Juan basin gas on to the San Francisco Bay area.

El Paso Natural will be prepared to ship an initial supply of from 35,000,000 to 40,000,000 cu. ft. of gas per day by May 1, Harris said. This supply will be stepped up to around 150,000,000 cu. ft. per day when Barker Dome, Kutz Canyon, Blanco, and other fields are connected up with the system of gathering lines now nearing completion in the producing area.



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To enable you to obtain MISSION percision and quality in all of these slush pump parts, we have perfected the new MISSION "Super-Service" Liner . . . accurately bored, ***induction*** hardened to ***uniform*** case thickness, precision honed, and "Satin Finished."

MISSION Pistons, Rods, Packing, Liners, and Valves will insure efficient, long-term operation of your slush pumps. Your supply store handles them . . . Mission Manufacturing Co., Houston, Texas. Export: 30 Rockefeller Plaza, New York. Europe: London, England.

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"ROLLING DOG" SLIPS
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Silver Anniversary MISSION MANUFACTURING CO. 1951

MISSION MANUFACTURING CO.

Another Beckham Bonanza?

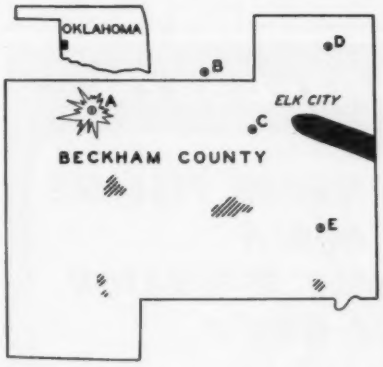
NOT since the discovery of Elk City field in the latter part of 1947 and the soon-to-follow stepouts which gave indications of the potentialities of this great field, has so much attention been directed to Beckham County in the far western part of Oklahoma.

Carter Oil Co. et al 1 Garrett (A on map), SE SE SE 32-11n-25w, a wildcat on a 3,680-acre unitized block about 21 miles west of the nearest oil producer in Elk City field, almost got away last week. While circulating for samples at a depth of 10,297 ft. the well blew oil and gas-cut mud 30 or 40 ft. into the air before the blowout preventer could be closed. Though the well is under control, mud-conditioning operations have met with little or no success. During the pumping of a 3,500-bbl. slug of heavy mud less fluid (gas-cut mud) returned than was pumped into the well. When a bleeder below the blowout preventer is opened a stream of gas, light oil, and mud shoots across the pits for 150 ft.

Indications are that Beckham County may be going to supply another significant oil field, but there are still a number of question marks to be erased before anyone can say for sure.

First of all it is not definitely known where the oil and gas are coming from in the penetrated section. Though two porous streaks were found up the hole, one of which (8,570-8,647 ft.) yielded some 60 ft. of heavily oil-cut mud and 5 gal. of free 40°-gravity oil on a drill-stem test, it seems probable that the influx is from the bottom of the hole. There was a definite drilling break 15 ft. above present depth, indicating sand or possibly granite-wash material, but because of the near-blowout no conclusive samples from this depth were caught. It is not even known exactly where the bottom of the hole is in the section since no electric log has been run below about 10,000 ft. However, there is no evidence to indicate that the hole is not still in the Hoxbar and rumors of Deese and Springer sands have no basis. Prior to the depth of the near-blowout the well had not encountered granite wash material except for a few thin streaks.

Right now efforts to get the wildcat



tamed to a point where drilling operations can continue safely are proceeding; that is, more mud to pump into the well is being mixed. The actual potentialities of this well will not be known until the "killing" operations are successful and tests conducted. In all likelihood Carter will carry this well deeper.

There are other interesting wells in the Beckham area that may tell a great deal more about what this complex region has to offer. Up in Roger Mills County, W. A. Delaney et al 1 Oscar Ewton (B on map), SE SW 17-11n-23w, is drilling below 11,000 ft. with immediate objective the evaluation of a "stray sand" picked up near 11,000 ft. where it was originally intended to set pipe to test shows up the hole at 9,200 ft. and 10,780 ft. This well is reported to be running considerably higher than Wilcox Oil Co. et al 1 Dugger (C on map), NW SE 12-10n-23w, which failed to make a well after encountering several promising-looking zones.

North of Elk City, United Carbon Co., Inc., and Union Producing Co. 1 Clark unit (D on map), NE NW 32-12n-21w, was drilling below 11,350 ft. on a 13,000-ft. test. No evidence of commercial production has been reported for this well.

Carter 1 State-Taylor (E on map), SW SW 31-9n-21w, is coring below 7,575 ft. Previous cores have shown this well to be in granite wash. The 1 State-Taylor is a prospective discoverer of a shallow zone, having recovered 2,170 ft. of 41.7°-gravity oil on a drill-stem test at 2,951-3,005 ft. However, as an offset well to this deep test failed to find production at the shallow depth, the significance of the reservoir is still questionable.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTH LOUISIANA.—Roeser & Pendleton 1 State Lease 1,468, Livingston Parish wildcat, flowed an estimated 250 bbl. of oil daily on 15-minute test. In Lafourche Parish, Superior Oil Co. and Clovelly Corp. 1 Clovelly Corp. flowed 170 bbl. of 32.9°-gravity oil daily through ⅛-in. choke through perforations at 12,346-60 ft. on initial test. Sparta production has been opened in Fordoche field, Pointe Coupee Parish.

ROCKY MOUNTAIN AREA.—Ohio Oil Co.'s 1 Sparks, wildcat in Cheyenne County, Nebraska, flowed more than 2,000,000 cu. ft. of gas on test of the "D" sand. Amerada Petroleum Corp. is perforating and testing its 1 Iverson, important Williams County, North Dakota, wildcat.

WEST TEXAS.—Sinclair Oil & Gas Co.'s 1 McElroy, Upton County wildcat 11 miles south of the Pegasus area, has been hailed as a major Ellenburger discovery. It flowed 276 bbl. of oil in 2 hours on a drill-stem test at 12,102-49 ft. and was being drilled ahead 50 ft. for another test.

NORTH TEXAS.—Old Glory field of Stonewall County, scene of considerable drilling activity in recent months, had prospects of a second pay in the Strawn sand. West Central Drilling Co. 1 Johnson topped the sand at 5,062 ft. and had flowing oil on a drill-stem test between 5,032-67 ft. Water entered on a test at 5,068-78 ft. and drilling was continued to the regular Bend conglomerate pay.

Mississippi

Tinsley Test Coring At 12,953 Ft.

JACKSON.—On the west side of Tinsley field, Yazoo County, Mississippi, Union Producing Co.-Jones-O'Brien 1 Logan, 23-10n-3w, has been cored from 12,766 to 12,953 ft. with recovery being red, hard, silty shale and red, hard, tight, silty sand. All is considered to be in the Buckner. This well is running 2,073 ft. lower than top of Smackover in Union Producing Co. 21 Jennie Stevens, 23-10n-3w, only other Smackover attempt in Tinsley. Operators had expected the 1 Logan to run low as it was drilled to test the possibility of getting porosity in the Smackover on the low side of the established faulting in the field. Operators are presently coring at 12,953 ft.

West Lincoln field, Lincoln County, seems assured of a third producer at Roeser & Pendleton 1 H. J. Grice Estate, SE NE 22-6n-6e, west offset to the field discovery well, Pan-Am 1 Holloway. The 1 Grice Estate had top of lower Tuscaloosa at 10,590 ft., (—10,103), and electric log indicated lower Tuscaloosa "stringer" sand at 10,652-75 ft. Operator perforated casing at 10,651-77 ft., and on drill-stem test, the well was reported flowing 8 to 10 bbl. of oil per hour through ¼-in. choke. Tubing pressure was 300 psi.

At the world's second deepest well, George Vasen 1 fee, SW NE 9-2s-11w, Stone County, it is reported that blowout equipment has been checked and installed and that operators are preparing to core ahead at approximately 20,300 ft. This well started kicking while operators were coring at 20,298 ft., at which time weighting material was pumped into the mud system and mud weight increased which killed the blow. Unconfirmed reports are that the last two cores taken from the well contained some oolitic lime, which was probably Smackover.

Efforts to confirm oil production in New Era field, Adams County, failed at Sun Oil Co.'s 1 A. J. Brown, 30-6n-3w, north offset to the discovery. The well was abandoned at total depth of 6,508 ft. in the Wilcox. The only show of oil in the well was reported in one side-wall sample at 6,441 ft. from very top part of the Parker sand zone of the Wilcox.

Continental Oil Co. 1 John R. Cameron, 36-10n-1e, Madison County, Mississippi, wildcat recovered fish at 13,130 ft. and is preparing to drill ahead in search of the Smackover.

MISSISSIPPI WILDCAT FAILURE

Lauderdale County: R. G. Houser 1 Flintkote Co., 20-8n-18e, dry, TD 3,006 ft.

"KILLER" SHALE SAYS:

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KEEPS DRILLING MUD CLEAN — PROVIDES *TRUE* SAMPLES OF CUTTINGS

North Central Texas

Mississippian Strike Finaled In Northeastern Archer

WICHITA FALLS.—A Mississippian strike in northeastern Archer County has been completed and a second well was setting casing to test the same formation.

The completed well is Wayne Freeman 1 J. M. Bloodworth, M. Cartwright Survey, north of Olney and about 2 miles northwest of Neal Mississippian field. Daily potential of 924 bbl. of oil was based on a flow of 77 bbl. of 43°-gravity oil in 2 hours through ½-in. choke on tubing. Perforations in casing were from 5,118-36 ft.

Five miles north of Olney, San Juan Oil Co. 1 S. L. Scott, BS&F Survey, topped the Ellenburger at 5,346 ft. and found no commercial shows in drilling to 5,527 ft. Operators set casing at 5,320 ft. to test a Mississippian section from 5,196-5,230 ft. which had oil shows when drilled.

Northeast of Scotland, Bridwell Oil Co. 9 Bridwell River Ranch was drilling below 4,735 ft. after recovering 63 ft. of oil and oil-cut mud on a drill-stem test at 4,682-4,710 ft. The section was not identified.

In Young County, Warren Oil Corp. 1 O. D. Swanzy, east of Olney and 2½ miles southeast of Mississippian production, had recovered some oil from both the Caddo and the Mississippian.

Top of the Caddo was 4,292 ft., drilled to 4,303 ft. and a 2-hour test of the section recovered 1½ bbl. of oil and 12 bbl. of heavily oil and gas-cut mud. Oil and gas-cut mud was recovered on two other tests, from 4,303-12 and 4,312-27 ft.

Top of the Mississippian was 4,876 ft. and drilled to 4,952 ft. A 2-hour test of the section had gas in 15 minutes and recovery was about 7 bbl. of heavily oil and gas-cut mud. Casing was set to 4,948 ft. after surveying and was to be perforated for further testing in the Mississippian.

New Strawn production for Knox County was in prospect at T. D. Humphrey 1 Mrs. Mattie Davis, 8 miles west of Knox City. A 2-hour test from 5,117-27 ft. recovered 100 ft. of clean oil. A second test after drilling to 5,175 ft. developed 540 ft. of clean oil, 60 ft. of oil-cut mud, and 2,600 ft. of salt water.

Stanolind Oil & Gas Co. 1 Wilson, D. G. Burnett Survey, has defined the south side of Knox City Palo Pinto reef field, being dry at 6,475 ft. in the Ellenburger. Tops were: Palo Pinto 4,174 ft., Caddo 5,580 ft., Mississippian 5,854 ft. and the Ellenburger at 6,130 ft.

In Throckmorton County, Cities Service Oil Co. 1-210 Swenson, wildcat 9 miles northwest of Throckmorton, drilled a show of oil from 4,773-78 ft., in the Caddo topped at 4,766 ft. A 2½-hour test of the section between 4,768-85 ft. had gas in 1 hour and a spray of distillate in 2 hours. Recovery

(Continued on page 146)

Kansas

Second Pool Indicated For Hodgeman County

SPREADING exploration in wide-open, far-western and southwestern Kansas has produced another promising oil discovery. I. W. Siegel, drilling at 1 Schraeder, NW SE NW 3-24s-24w, 7 miles southwest of Petmore, in Hodgeman County, logged saturation at 4,678-83 ft. in the Mississippi dolomite, topped at 4,655 ft. (—2,174 ft.), and in a drill-stem filled 1,680 ft. of clean 40°-gravity oil and 240 ft. of heavily oil-cut mud with tested open only 30 minutes.

If a well is completed it will open the second pool for the county, which is located in the middle of that vast, sparsely pooled region between the Central Kansas uplift development to the east and the Hugoton gas area to the west and southwest. The location is about 50 miles east of Hugoton gas production.

The county's first pool, located about 2 miles north of Jetmore and about 9 miles northeast of the Siegel well, was opened less than a year ago by Shell Oil Co. Production in that pool also is from the upper part of the Mississippian. Three wells have been completed.

The new Hodgeman County discovery follows closely one made the previous week by Cities Service Oil Co. in Gove County, about 50 miles to the northwest. In that discovery, the well, 1 Coberly, NW SE SE 15-14-29, recovered 400 ft. of clean oil and 240 ft. of oil-cut mud in a 30-minute drill-stem test at 4,284-4,313 ft. in Marmaton lime (Pennsylvanian). Since then, hole has been deepened, topping the Mississippian at 4,393 ft. and at latest report had reached a depth of 4,502 ft. No showings of commercial significance have been found below the Marmaton zone. Elevation is 2,641 ft.

Stanolind Oil & Gas Co. 1 Wall, C NE SE 35-32-23, which opens a rank wildcat oil pool near Ashland, Clark County, southwestern part of the state, near the Oklahoma line, pumped and flowed 129 bbl. net oil on potential tests. Production is from Viola lime, topped at 6,421 ft. (—4,393 ft.), and opposite which casing is perforated at 6,526-36 ft. This is the first pre-Mississippian production anywhere in that general region.

Imperial Petroleum Co. has completed its 1 Mathews, NW SE NW 19-17-10, discovery well of Mathews pool, southwestern Ellsworth County, with a bottom-hole bomb potential of 1,013 bbl. of oil per day. Previously the well pumped 8½ bbl. of oil per hour for 8 hours. Total depth is 3,085 ft. in the Lansing-Kansas City section, topped at 2,990 ft. (—1,147 ft.). Hole is open from 3,085 ft. The location is only ½ mile east of Bloomer pool but is separated from that pool by dry holes.

Franco Central Oil Co. and Penquin Petroleum, Inc., have run casing to test oil showings encountered in both the Maquoketa and Simpson zones in their 1 Bloomquist, a wildcat in the NE NE SW 11-16-4, 4½ miles southwest of Olsson pool, Saline County. Top of the Maquoketa is 3,461 ft. (—2,127 ft.). Porosity and saturation were logged in the top 4 ft. although a 45-minute drill-stem test of the interval got only a small show of oil with 20 ft. of drilling mud. The hole went out of this zone into the Viola at 3,515 ft. and found the Simpson sand at 3,595 ft. (—2,261 ft.). Oil shows were logged at 3,605-15 ft. Hole was carried to 3,640 ft. and casing run to 3,600 ft.

Lindas Oil Co. 1 Marquis, NE NE SW 4-17-14, a mile northeast of Capitol View pool, Barton County, recovered 10 ft. of heavy oil and 30 ft. of oil-cut mud in a 60-minute drill-stem test at 3,492-3,502 ft. in Arbuckle lime, topped at 3,491 ft. (—1,508 ft.) Casing has been run to the top of the pay.

KANSAS WILDCAT FAILURES

Barton County: Pierce 1 Prosser, NW NW SE 33-16s-12w, dry, TD 3,347 ft., Heebner 2,979 ft., lime 3,068 ft., Lansing-Kansas City 3,081 ft., Arbuckle 3,337 ft.

Butler County: Eckland et al 1 Davenport, NW NE NW 13-28s-3e, dry, TD 2,330 ft., Kansas City 2,212 ft.

Chase County: Morrison et al 1 Norton, SW SW SE 36-20s-8e, dry, TD 3,096 ft., Topeka 830 ft., Oread 1,130 ft., Douglas 1,215 ft., Lansing-Kansas City 1,491 ft., Marmaton 1,860 ft., Cherokee 2,145 ft., Mississippi lime 2,464 ft., Kinderhook 2,797 ft., Viola 2,906 ft., Simpson sand 2,995 ft., Arbuckle 3,048 ft.

Ellsworth County: B&R-Aurora 1 Kruse, NW NW NE 17-17s-9w, dry, TD 3,311 ft., Heebner 2,779 ft., Lansing-Kansas City 2,914 ft., Sooy 3,232 ft., Simpson shale 3,288 ft., Arbuckle 3,298 ft.

Morris County: Lincoln 1 Breckbill, NE SE SE 24-16s-5e, dry, TD 3,069 ft., Mississippi chat 2,183 ft., Kinderhook 2,251 ft., Hunton 2,421 ft., shale 2,570 ft., cherty Viola 2,641 ft., Simpson 2,727 ft., Arbuckle 2,808 ft., granite 3,066 ft.

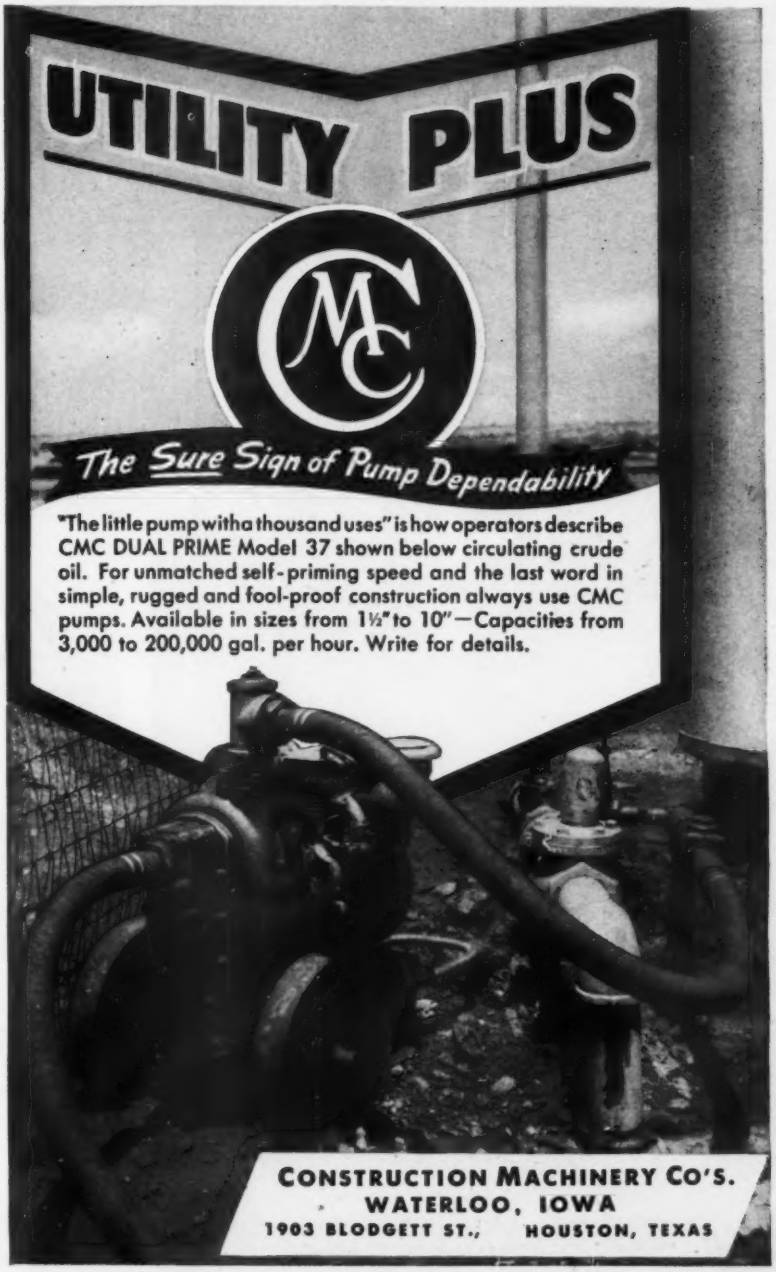
Phillips County: BHP 1 Vogel, SW SW NE 27-3s-19w, dry, TD 3,720 ft., anhydrite 1,675 ft., Weeber 3,266 ft., Toronto 3,291 ft., Lansing-Kansas City 3,307 ft., Arbuckle 3,643 ft.

Pottawatomie County: Siegel 1 Rezac, SW SW SW 7-9s-12e, dry, TD 3,607 ft., Heebner 1,165 ft., Lansing 1,378 ft., Kansas City 1,499 ft., Sooy 2,424 ft., sand 2,430 ft., Mississippi lime 2,440 ft., Kinderhook 2,637 ft., Hunton 2,884 ft., Maquoketa 3,329 ft., Viola 3,373 ft., St. Peter 3,512 ft., Dakota 3,482 ft., Arbuckle 3,589 ft., Reagan-Lamotte 3,598 ft., granite 3,605 ft.

Rawlins County: Loar-Stearns 2 McDougal, SW SW SE 13-3s-35w, dry, TD 2,000 ft., no tops available.

Russell County: Pickrell 1 Jacobs, NE NE SW 14-13s-15w, dry, TD 3,320 ft., Topeka 2,700 ft., Heebner 2,965 ft., Dodge 2,980 ft., Lansing-Kansas City 3,016 ft., Arbuckle 3,280 ft.

Continental Oil Co. 1 Hock, SW SW SW 13-15s-11w, dry, TD 3,404 ft., Heebner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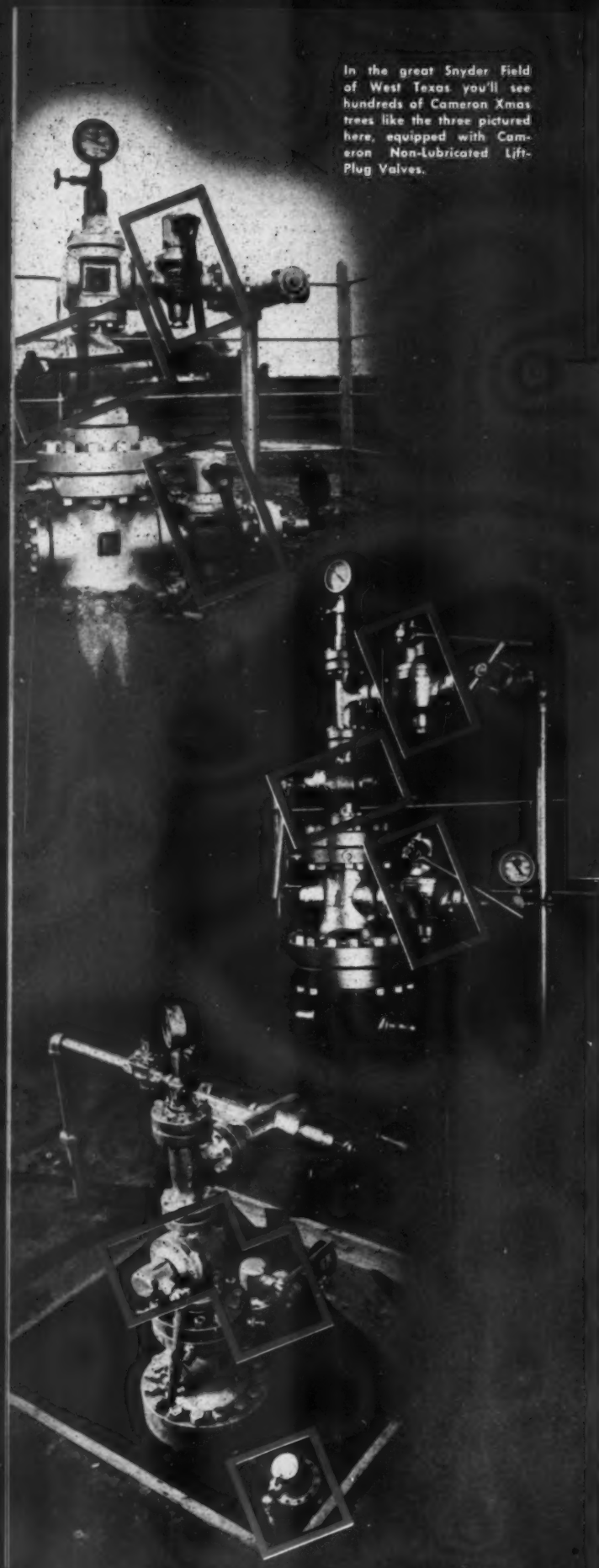

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Stafford County: GMR 1 Curtis, NE SE NE 28-22s-11w, dry, TD 3,702 ft., Lansing-Kansas City 3,272 ft., shaly Sooy 3,570 ft., Viola 3,585 ft., Simpson 3,612 ft., Arbuckle 3,672 ft.

Musgrove 1 Copeland, NW NW SW 17-23s-14w, dry, TD 4,144 ft., Heebner 3,444 ft., lime 3,579 ft., Lansing-Kansas City 3,592 ft., Sooy 3,920 ft., Viola 3,948 ft., Simpson 4,040 ft., Arbuckle 4,088 ft.

Oklahoma

Beckham County Wildcat Hits Gas-Distillate Flow

TWO deep wildcat tests located within 13 miles of each other in the extreme western part of the state, one in northwestern Beckham County and the other to the northeast across the line in southern Roger Mills County, are showing indications of opening new pools.

In Beckham County, Carter Oil Co. 1 Garrett, SE SE SE 32-11n-25w, drilled into a Pennsylvanian sand showing oil and gas around 10,264 ft. It started to lose circulation and while deepening at 10,297 ft. tried to blow out. It blew mud and gas, with a spray of distillate. Blowout-preventer rams were closed, and with the flow diverted to the pits, the well continued to blow a strong volume of gas and distillate spray whenever opened. At latest report, operators were mixing and pumping heavy mud to kill the well but were having trouble with loss of circulation.

Since no samples were obtained because of loss of circulation and the attempted blowout, identification of the zone has not been determined. The location, north of Erick and Mayfield, nearest towns, is about 24 miles west of the deep Elk City field. The small Erick gas field is about 6 miles to the south. The well previously had good oil showings in the Hoxbar zone, from which, at 8,570-8,647 ft., it yielded some 40° free oil with 60 ft. of heavily oil-cut mud in a 105-minute drill-stem test. The well is on a unitized block of 3,680 acres with eight participants, including Carter.

The Roger Mills County deep wildcat test is W. A. Delaney, Jr., 1 Oscar Newton, C SE SW 17-11n-23w, southwest of the town of Berlin. On location is a long string of 5½-in. casing, which operators had planned to run, after they reached a depth of 11,000 ft. (contract depth), to test promising oil and gas showings encountered in two zones, the best at 10,765-10,800 ft. and the other at 9,137-9,212 ft. At 11,000 ft., however, the well entered another sand and operators, at latest report, still were drilling ahead below 11,035 ft. for an evaluation of this zone before running the casing. Operators failed to get a drill-stem test of the zone at 10,765-10,800 ft. but cores and samples showed porosity and saturation. A test of the shallower zone yielded 210 ft. of heavily oil-cut mud (10 per cent 40° oil) and 280 ft. of gas-cut mud.

Unofficial field reports credit Mazda Oil Corp. with having found good oil showings and saturation in the Manning pay zone of Ringwood field, Major County, at its 1 Walker, NE SW NW 22-22n-11w, 2½ miles northwest of production on the field's undefined most westerly limits. The operating company has withheld information, but casing has been run with bottom of the hole believed to be slightly below 7,040 ft. Mazda has a possible ¾-mile northward extension of production for the field at its 1 Wolf, NE SE NE 26-22n-10w, where testing is under way. Total depth is 6,825 ft. with casing at 6,824 ft., 1 ft. off bottom.

Kerr-McGee Oil Industries, Inc., 1 Williams, NW NW NW 11-1s-3w, Springer sand discovery well on the east side of Tatums pool, Carter County, flowed 5,000,000 cu. ft. of gas per day through 24/64-in. choke. Testing continues. Casing is perforated in the Goodwin (Springer) sand at 4,606-78 ft. In the meantime, this company has made location for another Springer sand test 1½ miles to the northwest of the Williams gasser and a mile east of production of the pool. The latter location is in the SE SW SE 34-1n-3w, on the Garvin County side of the line.

(Continued on page 146)

Michigan

Mecosta County Wildcat Gets Oil Shows

MOUNT PLEASANT. — Gas shows were logged in both the Dundee and Reed City zone objective at Mercer Oil Co., Inc., and Smith Petroleum Co. 1 Soper, NW SW SW 13-16n-10w, Green Township wildcat, Mecosta County.

Dundee top was logged at 3,531 ft. and gas pay, which gaged at 276,000 cu. ft., but which blew down on a short test, was logged at 3,531-34 ft. In the Reed City zone, gas was showing at an estimated 150,000 cu. ft. at 3,660-62 ft. with an estimated increase to 250,000 cu. ft. at 3 674-78 ft. No oil shows were reported and wildcat was being drilled below 3,701 ft.

A show of Stray sand gas was reported on drill-stem test at Swan-King Oil Co. and Basin Oil Co. 1 Claus, NW NE NE 1,14n-5w, Deerfield Township wildcat, Isabella County, an exploratory well which is scheduled to be drilled to the Dundee as oil test and is reported to be checking structurally higher on upper control markers than correlating points. Stray sand was logged at 1,373 ft. A drill-stem test was run with packer set at 1,368 ft. and hole presently bottomed out at 1,393 ft. Gas showed in 14 minutes and was gaged at 43,000 cu. ft. A show of salt water and drilling mud were

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recovered on this test as well as the gas.

In the Skeels Dundee area, Gladwin County, where three failures have followed at offsets to the discovery producer, general interest was centered this week at Mogul Oil Co. 1 Johnson, SW NE SW 33-20n-2w, an outpost about a mile to the east, where coring was started at about 3,900 ft. short of the Dundee objective top. One other test, the northwest 10-acre offset to the discovery well, was being drilled in Skeels pool this week.

MICHIGAN SUCCESSFUL WILDCAT

Ogemaw County, Edwards Township: Basin Oil Co. 1 Winter, NE NE SW 15-21n-1e, Dundee 3,295 ft., 50 bbl. oil and 7 bbl. water, natural, TD 3,375 ft., PB to 3,372 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Monterey Township: W. B. Darke 1 Keel, SW NE SW 28-3n13w, Traverse 1,647 ft., dry, TD 1,700 ft.

Isabella County, Union Township: Wilkins & McPheron 1 Dennis, NW NE NE 1-14n-4w, Dundee 3,704 ft., dry, TD 3,826 ft.

Montcalm County, Bloomer Township: Mercer Oil Co., Inc., 1 Burns, SE SE SE 15-9n-5w, Dundee 3,081 ft., dry, TD 3,162 ft.

Newaygo County, Big Prairie Township: Eugene V. Cordell 1 Gorman, SE SW SE 31-13n-11w, Dundee 2,994 ft., dry, TD 3,194 ft.

Ottawa County, Allendale Township: Merrill Drilling Co. 1 Lotterman, NW NE SE 18-7n-13w, Traverse 1,954 ft., dry, TD 1,965 ft.

Tuscola County, Millington Township: Graham Wilcox 1 Hyslop, NE NW NW 31-10n-8e, Dundee 2,455 ft., dry, TD 2,598 ft.

Van Buren County, Decatur Township: Fisher-McCall Oil & Gas, Inc., 1 Polomack, NE SE SW 2-4s-14w, Traverse 1,016 ft., dry, TD 1,022 ft.

California

Castaic Junction Gets Probable Extension

LOS ANGELES.—Humble Oil & Refining Co. has set 7-in. casing on a wildcat which in all probability will extend oil production in Castaic Junction field, located at the eastern end of the Ventura basin and in Los Angeles County, about ⅞ mile to the east.

The extensioner, its 4 Newhall Land & Farming Co. in 19-4n-16w, topped an upper Mohnian oil sand at 10,306 ft. Six formation tests taken at about 50-ft. intervals between 10,328 and 10,609 ft. all resulted in the recovery of some 3,000 to 8,000 ft. of 19°-21°-gravity crude. Drilling was halted at 10,651 ft., after cutting sandy shale for about the last 50 ft.

If successfully completed the well will extend production from this Mohnian sand about 4,500 ft. eastward. Its 3 Newhall Land, which last December opened production in the sand at 9,745-8,880 ft., ran 400 ft. higher on the top of the oil sand and was completed as a 280-bbl. producer of 22°-gravity crude. The discovery well encountered about 95 ft. net of oil sand.

Humble 1 Newhall Land, located about ½ mile northwest of No. 3 and about 1½ miles northwest of No. 4, found this pay section shaled out. It was carried deeper and was completed as a 162-bbl. producer of 34°-gravity crude at 11,792-11,841 ft. to open Castaic Junction field.

With seven wildcats under way within a few miles of Castaic Junction and three others staked for early drilling, an additional two were announced last week. About 1 mile south of Del Valle production and 1½ miles northwest of Newhall-Potrero field, in 20-4n-17w, Southern California Petroleum Corp. has staked its 1 General Petroleum-Newhall Land. It will be about a 9,000-ft. test. In 32-5n-17w, and about ¼ mile east of Oak Canyon field, Chieftan Oil Co. has staked a 7,000-ft. test, its No. 1 Gilmour.

In 6-4n-16w, at Honor Rancho, a last August discovery, The Texas Co. was in the process of completing its third well. A 1,000-ft. stepout from the discovery, it was being completed in the same 5,400-ft. Modelo sand as the 1 Honor Rancho. Carried to a total depth of 5,574 ft., it did not test

(Continued on page 154)

Texas Gulf Coast

Grimes County Well Testing Gas Condensate

HOUSTON.—Annava Corp. is testing gas condensate at 1 Herbert Youens, wildcat 1½ miles northeast of Navasota in Grimes County. Although no details are being released, it is reported that operator perforated at 9,245-51 ft., acidized, and the well is now making an ungaged amount of gas condensate. On a previous test of perforations at 9,242-50 ft., the well swabbed slight amount of gas with trace of condensate and water. Hole is bottomed at 9,321 ft. and has 7-in. casing cemented at 9,296 ft. It is located in J. B. McNealy Survey.

New pay apparently is being opened in Durkee field, Harris County, at Petrex Oil Corp. 1 Sadie H. Southard, George Green Survey. The well is flowing an estimated 160 bbl. of oil through dual perforations at 7,050 ft. in the Fairbanks sand and around 7,200 ft. in the Look sand. This well is located approximately 680 ft. northeast of Union Producing Co. 1 Settegast Heirs, which recently opened new pay at 7,053 ft. in the Yegua.

On the southeast flank of Esperson Dome, Liberty County, General Crude Oil Co. C-1 Esperson gaged 14,000,000 cu. ft. of gas per day plus 18 bbl. of condensate per 1,000,000 cu. ft., opening a new sand. The wildcat was drilled to total depth of 11,694 ft. and operator perforated at 8,911-15 ft. for production tests. Location is in George L. Pace Survey.

Superior Oil Co. is preparing to perforate for production tests at 11,471-77 ft. at D-1 Mrs. Mathilda Tait, wildcat test 2 miles northwest of Altair in Colorado County. The well was drilled to total depth of 12,725 ft. and electric log run to bottom. On a previous drill-stem test from 10,726-72 ft. using ¼-in. bottom and 10/64-in. top chokes, well developed 2,800-psi. working pressure and flowed at the rate of 5,375,000 cu. ft. of gas per day plus 42 bbl. of 49°-gravity condensate. Prior to this test, operator perforated at 10,448-58 ft. and the well flowed 2,382,000 cu. ft. of gas plus 52 bbl. of 49.8°-gravity condensate. The wildcat is located in John Byrne Survey, Abstract 10.

The second oiler in the new Fordtran Townsite field of Victoria County, Kirby Petroleum Co. 1 A. R. McGehee-Eva Schwabe unit, has been potentialed for 39 bbl. of oil per day through ¼-in. choke. The well was drilled to a depth of 8,440 ft. and operator logged 45 ft. of solid Wilcox oil sand from 8,140-85 ft. in the well. Production was through perforations at 8,146-50 ft. The well lies 1,650 ft. north-northeast of the field discovery, Kirby 1 Buchanan. Both wells are located in IRR Co. Survey 7, A-204.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Phillips Petroleum Co. 1 Hudson, I&GN Sur. 26, A-619, 3½ mi. E of Alvin, dry, TD 10,682 ft.

Calhoun County: Quintana Petroleum Corp. B-1 George O. & M. J. Duncan, William Lewis Sur., 2 mi. SW of East Long Mott field, dry, TD 9,308 ft.

Fort Bend County: Sterling Oil & Gas Co. 1 Meyer, D. L. M. Tittsworth Sur., A-531, 3 mi. N of Needville, dry, TD 6,274 ft.

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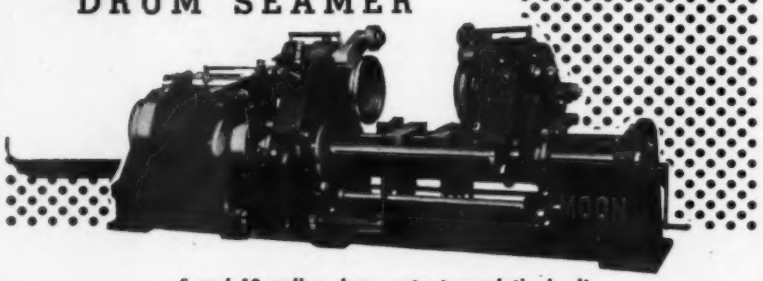

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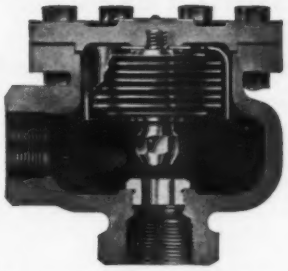

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Jefferson County: H. B. Hebert, et al, 1 Garth, Burrell Jones Sur., A-155, 2½ mi. NE Nome, dry, TD 8,201 ft.

Matagorda County: P. R. Rutherford 1 Hadley, et al, Josiah Tilley League, 2 mi. NE of Blessing, dry, TD 9,891 ft.

Polk County: Jordan Drilling Co. 1 J. V. Lapham, B. W. Hardin Sur., A-267, dry, TD 7,515 ft.

San Jacinto County: Miles Production Co. 1 W. Ellisor, J. M. De La Garza Sur., A-18, 12 mi. W of Cold Springs, dry, TD 8,008 ft.

Victoria County: Southern Minerals Corp. 3 McFaddin Ranch, IRR Co. Sur. 15, A,215, 9 mi. N-NE of Victoria, dry, TD 4,250 ft.

Washington County: Hamon & Cox, et al, 1 Shaver, E. R. Miller League, A-84, 5 mi. N of Chapel Hill, dry, TD 9,657 ft.

South Louisiana

Two New Discoveries In South Louisiana

NEW ORLEANS.—Two new oil discoveries highlighted activity in South Louisiana for the week. In Livingston Parish, Roser & Pendleton 1 State Lease 1,468, wildcat on the Lake Maurepas prospect, in Tract 3,405, State Lease 1,468, flowed 10 to 11 bbl. of oil per hour on drill-stem test at 9,815-22 ft. Tubing with packer was set to 9,768 ft. and ¼-in. bottom and ⅛-in. top chokes were employed on the test. The well flowed for 15 minutes at the estimated rate of 250 bbl. per day. The hole was drilled to total depth of 10,270 ft., plugged back and drilled to 10,095 ft. in sidetracked hole. Operator is preparing to run production packer for completion tests.

The other new discovery is Superior Oil Co. and Clovelly Corp. 1 Clovelly Corp., 33-18s-22e, on the Brustle prospect in Lafourche Parish. On initial test the well flowed 170 bbl. of 32.9°-gravity oil per day through ⅛-in. choke through casing perforations at 12,346-60 ft. Tubing pressure was 1,100 psi. and gas-oil ratio 818 to 1. Well was drilled to total depth of 13,930 ft. and operator set oil string at 12,425 ft. after running electrical survey. Before perforating, hole was plugged back to 12,370 ft.

Although unconfirmed, it is reported that Richardson & Bass have found oil sand at 1-K Lafourche Realty Co., wildcat in the East Golden Meadow area, 31-19s-23e, Lafourche Parish. Side-wall samples from 11,250-330 ft. recovered sand with good show of oil. Operators are drilling ahead below 12,740 ft. in the prospective discovery.

New pay has been established in Fordoche field, Pointe Coupee Parish, at The Texas Co. 1 State-Reno, et al, Unit 1, 37-5s-8e. On initial production test, the well flowed 132 bbl. of oil per day through 8/64-in. choke. Gravity of the oil was 48.8° and water was present on the test. Production is through perforations in the Sparta zone at 10,420-36 ft. Tubing pressure was 1,910 psi. Total depth of the new sander is 10,680 ft. with 5-in. casing cemented at 10,500 ft.

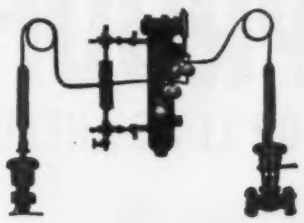
Final completion has been made on Sun Oil Co. 1 Brooks, 20-10s-12w, Calcasieu Parish discovery located 1¼ miles west-southwest of Vinton townsite. Through perforations at 10,868-80 ft., the well flowed 41 bbl. of 45.3°-gravity oil daily. Tubing pressure was 2,050 psi. and casing pressure was 1,850 psi. This well was originally abandoned at total depth of 11,346 ft. with no shows. It was plugged back and drilled to 11,002 ft. in sidetracked hole for completion.

SOUTH LOUISIANA WILDCAT FAILURES

Assumption Parish: Humble Oil & Refining Co. 1 Nickolas Kafoury, 35-13s-13e, dry, TD 12,087 ft.

Iberville Parish: Placid Oil Co. 1 Wilbert's "Enterprise," 46-9s-12e, dry, TD 11,548 ft. (temporarily abandoned).

Vermilion Parish: Humble Oil & Refining Co. 1 Louisiana Fur. "G," 6-15s-3e, dry, TD 9,565 ft.



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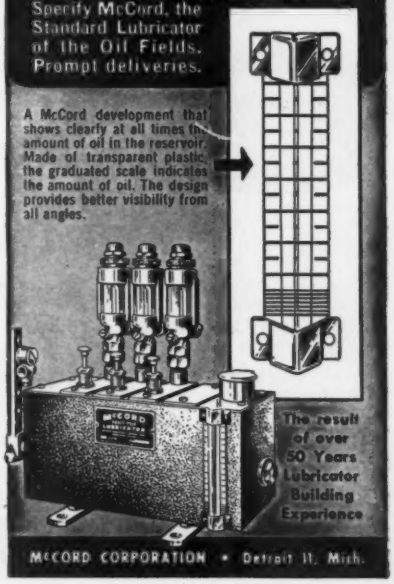
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Southwest Texas

New Producer Near Hidalgo's McAllen Field

CORPUS CHRISTI.—The Texas Co. has run an open flow gage on 1 El Texano Land Co., gas-condensate discovery well approximately 6 miles south-southwest of McAllen field, Hidalgo County. Through perforations at 6,240-54 ft., the well made 7,000,000 cu. ft. of gas per day plus 6 bbl. of 61.4°-gravity condensate per million cubic feet of gas. Hole was drilled to a total depth of 12,018 ft., and operator plugged back to 6,261 ft. for completion. The new producer is located in Juan Antonio Villareal Porcion 64, Abstract 41.

Approximately 2 miles west of Cedro Hill field, Duval County, Magnolia Petroleum Co. has completed 7 Duval County Ranch Co., Section 196, for a new oil discovery. Through perforations at 2,064-68 ft., the well flowed 93 bbl. of 20°-gravity oil per day with no water. Cedro Hill field produces mostly from the 1,400-ft. section. This new producer was drilled to 2,105 ft. and operator set 6⅝-in. pipe at 2,104 ft. for completion. It is located in DCRC Survey 196, Abstract 853, approximately 12 miles southwest of Freer.

Val Verde County's wildcat, R. J. Caraway 1 Guida Rose Martin, is drilling ahead toward the Ellenburger after flowing dry gas at the rate of 4,800,000 cu. ft. daily on drill-stem test at 10,060-146 ft. The test was said to be in the Bend lime of the Basal Pennsylvanian topped at 10,040 ft. It will be recalled that this well flowed dry gas at the rate of 3,400,000 cu. ft. of gas daily from the Strawn lime at 9,851-10,003 ft. Top of the Strawn was called at 9,889 ft. (—7,918 ft.). This rank wildcat is located in Section 2, Block B, GS&F Survey, approximately 24 miles south of Sonora.

In the new East Jones field of Jim Hogg County, Sun Oil Co. has set casing at 4,676 ft. in 1 A. C. Jones-State, located approximately ¾ mile south-southwest of the field discovery well, 10 Jones. No tests have been run on this wildcat, which is located in Antonio Garza Acevedo Survey 276.

In the Dagger Island area of Nueces County, Sunray Oil Corp. 1 State Tract 352, wildcat in Red Fish Bay, at last report was drilling below 6,140 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Hidalgo County: Gas-condensate discovery—The Texas Co. 1 El Texano Land Co., Juan Antonio Villareal Porcion 64, A-41, TD 12,018 ft., perf. 6,240-54 ft., IP: 7,200,000 cu. ft. of gas per day, open flow, plus 6 bbl. condensate per million cu. ft., 61.4° grav.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Duval County: John F. Camp & Sons, et al, 3 Clara Driscoll Estate, William Gray Survey 8, A-212, dry, TD 3,278 ft.

Hidalgo County: Continental Oil Co. 1 P. H. Longoria, et al, Tract 6-A, Share 9-A, San Ramon Grant, dry, TD 9,556 ft.

Jim Hogg County: The Chicago Corp. 1 G. Gomez, BS&F Sur. 121, A-44, dry, TD 2,903 ft.

Sun Oil Co. 12 A. C. Jones, Agua Nueva de Abajo Grant, dry, TD 5,958 ft.

LaSalle County: Skelly Oil Co. 1 John K. Schorp, Mary Latimer Sur., A-1,050, dry, TD 6,310 ft.

McMullen County: Harold K. Boysen 8 Nueces Land & Livestock Co., Jacob Matossy Sur. 86, A-306, dry, TD 2,306 ft.

Real County: John I. Moore 1 Claude Haby, Sec. 111, City of San Antonio Alazan Ditch Sur., 12 mi. SE of Leaky, dry, TD 7,250 ft.

San Patricio County: Superior Oil Co. 1 First National Bank of Houston, Juan de la Garza Sur., A-7, dry, TD 5,800 ft.

Starr County: Gerker Oil Field Co. 1 H. R. Maresh, CCSD&RGNG RR Sur., 303, 18 mi. NE of Rio Grande City, dry, TD 3,610 ft.

J. Arthur Lundell 1 Marrs McLean, Share 1-A, Porcion 79 and 80, 6 mi. N of Rio Grande, dry, TD 1,620 ft.

Webb County: O. W. Killam 1 Armstrong-Strohman, Share 5, Los Animas Grant, dry, TD 2,958 ft.

Wilson County: Martin, Shelly & Thomas 1 E. H. Ellinghausen, Luis Manchaca Sur., A-18, dry, TD 4,305 ft.

Eastern Texas

Extension Well Completed In Sandusky Oil Creek

DALLAS.—An extension well to Sandusky Oil Creek field has been completed flowing 428 bbl. of 50°-gravity oil in 15 hours through ¼-in. choke. The new producer is Olson Drilling Co. 1 Q. Little, O. C. Walker Survey and about 1,600 ft. northeast of L. O. McMillan 1 Chambers. Total depth was 7,172 ft., with top of the Oil Creek sand at 7,172 ft.

Northwest of Pottsboro and about 10 miles east of Sandusky, Mid-Continent Petroleum Corp. and Skelly Oil Co. 1-D Chiles was drilling below 5,210 ft.

Gas-distillate shows were reported in R. J. Caraway 1 Puckett, deep Rains County wildcat 6 miles southeast of Emory, but a drill-stem test from 11,883-12,143 ft. had gas and recovered the water blanket, emulsion, and sulfur water. The testing tool was closed when water cushion reached the surface in 31 minutes. Total depth was 12,607 ft.

A 1-mile northeast extension of upper Rodessa pay in the Tennessee Colony area of Anderson County, was in prospect at Big Chief Drilling Co. 1 Hughes. A 45-minute drill-stem test from 8,844-99 ft. recovered the 3,000-ft. water cushion, 1,260 ft. of 53°-gravity oil and 106 ft. of oil and gas-cut mud.

A southwest extension attempt at Continental Oil Co. 1 Carroll was drilling below 9,644 ft., in the Pettit limestone.

Humble Oil & Refining Co. has completed a second well in the new Cornersville field of southeast Hopkins County, at its 1 B. H. Harris, J. G. Weems Survey. The northeast offset flowed 116 bbl. of oil a day from the Bacon limestone at 7,878-99 ft.

Field sources indicated Stanolind Oil & Gas Co. 1 Irvin, Upshur County wildcat drilled to 11,058 ft., in the Cotton Valley, might be carried to 13,000 ft. to test the Smackover formation.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Falls County: Dee Production Co. 1 Bill Adams, S. W. Hunnicut Sur., 2 mi. W Chilton, dry, TD 962 ft.

J. M. Justice 1 H. C. Hicks, J. A. Manchaca Sur., ½ mi. NE Chilton, dry, TD 1,023 ft., elev. 467 ft., Austin chalk 701 ft, Buda 1,021 ft.

Mid-States Oil Corp. 1 B. E. Mitchell, Geo. Morgan Sur., 4 mi. SE Perry, dry, TD 1,240 ft., Buda 945 ft.

San Juan Oil Co. 1 Perkins, P. Zarza Sur., 6 mi. NW Lott, dry, TD 963 ft., Buda 640 ft., Edwards 954 ft.

Grayson County: Sinclair Oil & Gas Co. 1 R. H. Jewell, T. Toby Sur., 1½ mi. SW Sandusky, dry, TD 8,190 ft., elev. 723 ft., Oil Creek 7,443 ft., Joins 7,507 ft.

Limestone County: E. W. Jarman 1 Mrs. Lola Garrett, M. Hunt Sur., 2 mi. NW Kosse, dry, TD 5,567 ft., elev. 484 ft., Austin 2,776 ft., Woodbine 3,450 ft., Rodessa 5,513 ft.

Navarro County: Coffield & Guthrie, Inc. 1 Gussie Weaver, Ross Sur., 2 mi. SE Richland, dry, TD 3,068 ft., elev. 333 ft., Austin 2,325 ft.

Rains County: Sam Jordan 1 C. F. Dowell, A. R. Taylor Sur., 2 mi. NW Point, dry, TD 5,850 ft., Woodbine 3,930 ft., Paluxy 5,541 ft.

Wood County: A. O. Phillips and Stanolind Oil & Gas Co. 1 C. P. McKnight, T. H. Rogers Sur., 1 mi. W Quitman, dry, TD

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Stanolind 1 R. L. Peveto, Sarah McDonald Sur., 2 mi. SW antis, dry, TD 8,504 ft., Woodbine 4,340 ft., Comanche 5,133 ft., Paluxy 6,195 ft., Glen Rose 6,555 ft., Massive anhydrite 7,580-7,723 ft., Travis Peak 8,220 ft.

Rocky Mountain

Apparent New Discovery In Cheyenne Co., Nebraska

DENVER.—A new discovery for Ohio Oil Co. is apparent following tests of another wildcat in Cheyenne County, Nebraska. The well is 1 Sparks, NE SE NE 29-15n-49w, between Ohio's Gurley and Huntsman pools. On drill-stem test in the first sand (D sand) between 4,500-07 ft. the well flowed at a rate of more than 2,000,000 cu. ft. of gas daily. The operator is coring ahead in the formation. Oil is produced from the D sand at Ohio's Gurley pool, and both oil and gas are found in that zone at Huntsman. Ohio recently abandoned a wildcat 4 miles south of the present test, and east of Huntsman pool, after failing to find production to the Morrison.

North of these pools Sinclair Oil & Gas Co. has two apparent failures in the Dalton area, northern Cheyenne County. The 1 Munshaw, NW NW NW 29-17n-49w, one location east of the Dalton discovery, failed to show oil on drill-stem test of the third sand, the zone productive in the discovery. A second well, 1 mile south of the discovery, was reported running low structurally and had no shows in the first sand. These are Sinclair's first operations in the Denver-Julesburg basin, although the company has extensive lease holdings in the area.

Amerada Petroleum Corp. has had some delay in testing the important 1 Iverson, C SW 6-155n-95w, wildcat in the Beaver Lodge area, Williams County, North Dakota. The well was drilled to 11,744 ft., total depth, with Jefferson (?) topped at 10,110 ft. Casing has been cemented at 11,743 ft. and perforated between 11,708-20 ft. with four holes per foot. Amerada is expected to give this well thorough testing below 10,000 ft., and reportedly found gas, with some shows of oil in the lower zones. The well is located on the long Nesson anticline, in the west-central area of the Williston basin, and is the first well to this depth in the State.

Unofficial and incomplete tests have finally been made of the Americol Oil Co. 1 Shaffer, C SW SW 31-26s-21e, wildcat in the Cane Creek area, Grand County, Utah, and the well reportedly made some 60 bbl. of oil with considerable salt water in an unreported time. The well is at 5,452 ft., total depth, reportedly in Mississippian, and shows of oil at the present depth have been widely publicized during the past 3 weeks. The operator was coring at that depth when oil shows were encountered, and the core is reportedly still in the hole, with the test made by opening a valve at the well head. At the present time information is not complete on the test and operator has not announced plans for the well.

COLORADO WILDCAT FAILURE

Nucla, Montrose County: Continental Oil Co. 1 Unit, CW½ NE SW 18-47n-14w; 7,618 ft. TD; abandoned. Granite wash 1,342 ft., Hermosa 5,105 ft., Paradox 5,142 ft., Molas 6,410 ft., Mississippian (?) 6,482 ft., Devonian 6,678 ft., Elbert 7,316 ft.

WYOMING WILDCAT SUCCESS

South Glenrock, Converse County: Shell Oil Co. 1 Government, SW NW SW 15-33n-75w; 7,131 ft. TD; flowed 550 bbl. oil per day; 5½-in. casing at 7,090 ft., Fox Hills 536 ft., Lewis 899 ft., Teapot 1,440 ft., Parkman 1,855 ft., Steele 2,200 (?) ft., Shannon 3,765 ft., Niobrara 5,200 (?) ft., Frontier 5,960 ft., Mowry 6,731 ft., Muddy 6,917 ft., Thermopolis 6,950 ft., Dakota pay 7,094-7,144 ft.

WYOMING WILDCAT FAILURE

Twenty Mile area, Niobrara County: Reserve Drilling Co. et al 1 Government, SE SE SW 4-37n-64w; 8,113 ft. TD; abandoned. Dakota 7,377 ft., Fuson 7,470 ft., Lakota 7,516 ft., Sundance 7,771½ ft., Basal Sundance 8,040 ft., Red Beds 8,086 ft.

UTAH WILDCAT SUCCESS

Red Wash, Uintah County: The California Co. 1 Unit, NE NE NE 26-7s-23e; 5,270 ft. TD; flow 392 bbl. oil in 24 hours, 7-in. casing at 5,160 ft., Duchesne River 0-400 ft., Uintah 400, Green River 2,685 ft.

UTAH WILDCAT FAILURES

Salt Lake, Salt Lake County: Byrd-Frost, Inc., 1 Bassard, C SE NW 9-1n-2w; 1,919 ft. TD; abandoned.

Brush Creek, Uintah County: Roy M. Johnson et al 2 Neal, C SE NE 2-5s-22e.; 1,412 ft. TD; abandoned.

IDAHO WILDCAT FAILURE

Juniper Anticline, Oneida County: Phillips Petroleum Co. and Utah Southern Oil Co. 1 Juniper, NW SW SW 10-14s-30e; 12,844 ft. TD; abandoned.

NEBRASKA WILDCAT FAILURES

North Sidney, Cheyenne County: Ohio Oil Co. 1 Beyer "B," NW NW SE 19-14n-49w; 4,930 ft. TD; abandoned: Niobrara 3,897 ft., Fort Hays 4,209 ft., Codell 4,305 ft., Greenhorn 4,462 ft., first Dakota 4,732 ft., second Dakota 4,811 ft., third Dakota 4,855 ft.

South Sidney, Cheyenne County: H. L. Rogers and B. B. Carter 1 Bright, SW SW NW 2-13n-50w; 4,870 ft. TD; abandoned. Niobrara 3,804 ft., Fort Hays 4,095 ft., Codell 4,188 ft., Greenhorn 4,361 ft., first Dakota 4,637 ft., third Dakota 4,814 ft., Skull Creek 4,865 ft.

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Appalachian-Ohio

Good Gasser Completed In Clinton Co., Pennsylvania

PITTSBURGH.—In Leidy Township, Clinton County, North Central Pennsylvania, New York State Natural Gas Corp. completed N-193 Chancie H. Summerson, elevation 934 ft., gaging 2,250,000 cu. ft. of gas, with rock pressure 3,420 psi. in 40 hours, Onondaga lime 5,654 ft., Oriskany sand 5,680 ft., gas 5,682 ft., total depth 5,685 ft.; Pettigrew & Daswell have commenced operations at 1 Hedgeland. In Chapman Township, John McGuire has started 1 Hazel McGuire.

In Southwest Pennsylvania, Unity Township, Westmoreland County, Peoples Natural Gas Co. 1-3921 Fred Musnug, elevation 2,100 ft., is shut down to run casing. The Onondaga lime was recorded at 7,980 ft. and the chert at 8,003 ft.

In the Mountain Lake Park section, Garrett County, Maryland, operations have been started at one new well: Eagle Oil & Gas Co. has moved in at 1 Emil Germain. Acidizing is being done by Columbian Carbon Co. in 1-GW-1504 Joni J. Miller and by George L. Yaste in 1 Grimes. This well recorded the chert 3,387-3,487 ft., gas 3,407-3,414 ft., Oriskany sand 3,510-3,631 ft., gas 3,573-90 ft., shut down at 3,651 ft. The elevation is 2,421 ft. Eberly & Snee 1 Virginia E. Baker, elevation 2,415 ft., is drilling at 3,302 ft., chert at 3,099 ft., and Oriskany sand at 3,222 ft. In 1 Gordon, elevation 2,464 ft., they are drilling at 3,865 ft., chert 3,725-98 ft., gas 3,735-53 ft., 321,000 cu. ft. gas, Oriskany sand 3,856 ft.

In Portland district, Preston County, West Virginia, Eberly & Snee 1 S. F. Calvert, elevation 2,180 ft., is shut down at 5,265 ft. Onondaga lime was reached at 5,190 ft., chert 5,223 ft., wtih gas at 5,260-65 ft. testing 1,800,000 cu. ft. In Ravenswood district, Jackson County, Norman L. Botkin com-

pleted 1 J. G. Merrill et al, testing 50 bbl. of oil per day in the Berea sand, total depth 2,400 ft.

OHIO

COLUMBUS.—Preston Oil Co. 2 F. O. Garrison, 3rd quarter, New Castle Township, Coshocton County, in the western part of the area, made 8 bbl. of oil, natural, and 75 bbl. in 24 hours after a 90-qt. shot. The Clinton sand was found at 3,153-90 ft. One and one-half miles to the east in the same pool, Pure Oil 2 P. & N. Richards, 3rd quarter, made a good oil showing with 100,000 cu. ft. of gas, natural. After a 90-qt. shot, the well made 50 bbl. of oil the first day with the sand being logged at 3,297-3,352 ft.

In Jackson Township, Knox County, Mid East Oil Co. 6 C. M. Darling drilled in with a good showing of both oil and gas, natural, and made 40 bbl. of oil with 300,000 cu. ft. of gas in 24 hours after shot. The Clinton sand came in at 2,856-2,912 ft.

Jay Hunt et al. 7 S. S. Cooperider, Section 3, Bowling Green Township, Licking County, east offset to their big well, made 85 bbl. the first day after shot.

L. F. McGrath et al. completed another good well in the Clinton in Parma Township, Cuyahoga County, on 1 L. J. Carl, Lot 35. Red Clinton at 3,059-82 ft. made 725,000 cu. ft. of gas and white sand at 3,090-93 ft. an additional 100,000 cu. ft. The well was tubed natural.

Permian Basin

Upton Gets Good Ellenburger Prospect

MIDLAND.—A good Ellenburger discovery was in prospect for northwest Upton County at Sinclair Oil & Gas Co. 1 McElroy Ranch, 11 miles south and west of the Pegasus field. Nearest Ellenburger production is about 9 miles north in the one-well Sinclair field.

First Ellenburger oil was recovered on a 4-hour test from 12,040-110 ft., which recovered the water cushion and over 1,700 ft. of clean, 46°-gravity oil, with no formation water. The well did not flow but the water blanket and oil unloaded while pipe was being pulled.

Second test, open 2 hours and 40 minutes, was run from 12,102-149 ft. There was a good blow of gas immediately; water blanket flowed in 20 minutes and oil in 30. It was cleaned into pits for 10 minutes, then gaged 146 bbl. of 53°-gravity oil the first hour and 141 bbl. the second hour through ½-in. choke. Gas-oil ratio was estimated at 350 cu. ft.

Top of the Ellenburger was reported at 12,042 ft. on elevation of 2,781 ft., making it approximately 1,800 ft. high on that formation to a dry hole 2½ miles north.

South of the Benedum district, Cities Service Oil Co. and Continental Oil Co. 1-AH University, has abandoned attempts to complete in the Ellenburger due to water. The hole was plugged back to 10,754 ft. and casing perforated from 10,735-45 ft. A test of the perforations unloaded 41 bbl. of oil in 1 hour, then flowed 177 bbl. of 60°-gravity oil in 14 hours through 11/64-in. choke.

In west-central Midland County, The Texas Co. 1-B Scharbauer developed flowing oil on a drill-stem test in limestone identified as the Strawn, and was drilling ahead. The test was run from 10,285-10,323 ft. Gas showed in 3 minutes, and oil and mud flowed in 38 minutes. It was cleaned into pits for 1 hour and 42 minutes, then turned into tanks for 3 hours where it gaged 29.5 bbl. of 48°-gravity oil the first hour through 5/16-in. choke, and 20.5 bbl. of oil during the last 2 hours. The well also developed heavily oil and gas-cut mud, plus 540 ft. of free oil from the Wolfcamp at 9,600-9,790 ft. Location is about 3 miles northeast of Magnolia Petroleum Co.'s Parks discovery.

Tex Harvey Spraberry field was about to get another 2-mile extension, this one to the south at El Capitan Oil Co. 1 Mrs. W. A. Hutchison. First Spraberry oil was devel-

(Continued on page 152)

Louisiana-Arkansas

Big Gas Well Opens Simsboro New Pay

SHREVEPORT.—In Lincoln Parish, Pan-Am Southern Corp. and Murphy Corp. opened a new pay zone in Simsboro field. The 1 Givens, in 11-17n-4w, was dually completed in two horizons. It made 36,200,000 cu. ft. of gas plus some distillate from the James lime at 5,714-26 ft. It also found 4,100,000 cu. ft. of gas per day in the regular producing zone in the field, the Gardner sand at 6,528-48 ft. The hole was drilled to the Cotton Valley at 10,100 ft. and plugged back to bottom of 7-in. casing set at 7,030 ft. In Section 2-17n-4w, Murphy is coring at 6,813 ft. in the wildcat 2 Givens.

Between Sarepta and South Sarepta areas, Bossier Parish, Magnolia Petroleum Co. is running 5½-in. producing casing to 10,083 ft., total depth, at its 1 Stroud, 16-22n-11w. There was a good show in the Ardis sand (Cotton Valley formation) around 9,350 ft. Initial tests will start in the lower Cotton Valley. In the same parish, Skelly Oil Co.'s 1 Ledbetter, a Pettit exploration in 7-18n-11w, is drilling below 5,100 ft.

In Sabine Parish, Major Oil Co. A-1 Long

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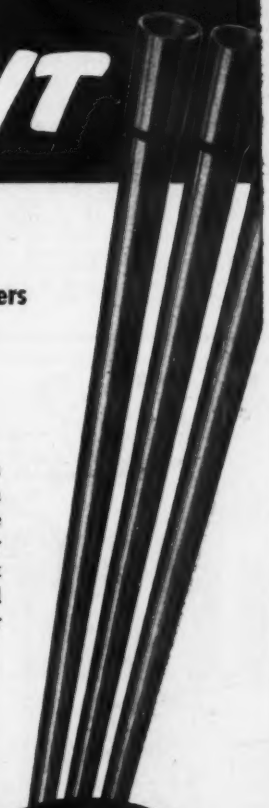

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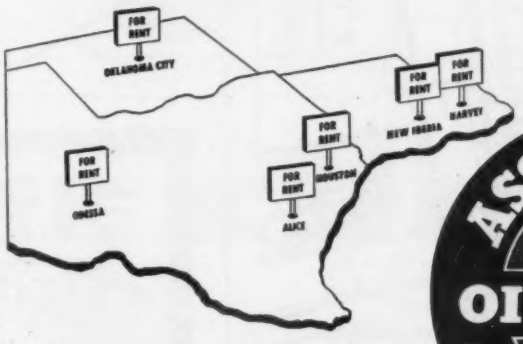

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Phone UPtown 8585

Bell Lumber Co., 24-8s-14w, pumped approximately 16 bbl. of oil daily plus a large amount of salt water, from 2,440 ft.

Gulf Refining Co. has slated its second deep test in Caddo-Pine Island field of Caddo Parish. The new venture, Gulf 280-N Caddo Levee Board, will go to 8,500 ft., or the Cotton Valley. Located in 20-20n-16w, it is about 2 miles south and 3 west of the company's 279-N well, which recently opened the field's first Pettit pay.

In Webster Parish, Atlantic Refining Co. has planned an 11,500-ft. geological wildcat in Sibley field, with the Smackover expected around the scheduled total depth. The test, 1 Phillip Holley, is spotted in N/2 SE NE 28-8n-9w. The deepest producing zone in the field is now the Pettit.

Arkansas. — The now-unproductive Wilks field of Union County has a test currently active. The wildcat, Murphy Corp. 1 Gottschell, 3-18s-18w, is drilling below 3,630 ft. In the same county, Curtis Kinard has encountered no encouragement at his 1 Clark in 21-18s-12w. Crew is drilling ahead near the proposed total depth of 6,400 ft.

In Columbia County, Gulf Refining Co. 1 Pittman estate, 9-17s-20w, was finished dry at 8,019 ft. It topped the Smackover lime at 7,684 ft., and cored shows at 7,668-7,717 ft. drill-stem tests (one at that interval, and one from 7,682-7,715 ft.) recovered mainly salt water. In the same county, Arkansas Fuel Oil Co. 1 Glass estate, 1-19s-23w, is drilling below 9,400 ft. toward its goal of 10,500 ft., with plans for immediate coring.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Catahoula Parish: Hunt Oil Co. and Gulf Refining Co. 27 Delta Hardwood Lumber Co., Inc. et al, C SE SW 27-4n-5e, flowed 76 bbl. 42°-gravity oil per day from Wilcox at 5,895-99 ft., perf. with 20 shots, 14/64-in. tubing choke, Vicksburg 2,504 ft., Cook Mountain 3,400 ft., TD 7,500 ft., elev. 48 ft. DF, opens Mitten Lake pool.

Illinois-Ind.-Ky.

Rosiclare Produces in Knox County Discovery

A NEW oil pool is in prospect in eastern Knox County, Indiana, where W-G-R Drilling Co. is putting its 2 Earl Wampler, in Militia Donation 152-4n-8w, on the pump as an indicated 75 to 100-bbl. per day producer from Rosiclare lime. Saturation was logged at 1,382-84 ft. with bottom of the hole still in the pay. Hole is open below 1,361 ft., where 5½-in. casing was cemented. The location is approximately 2 miles south of the town of Bicknell. Nearest production is in the Plainville pool, about 8 miles to the northeast in northwestern Daviess County.

Another area in the same county is being reactivated with a good-looking well being completed by Davis Lambert at his 1 Verne Junkins, NWc NE Militia Donation 166-2n-9w. The area is about 2 miles southwest of Monroe City, in the southern part of the county, about 15 miles southwest of the Bicknell discovery. During swabbing tests, well produced at an average rate of 12 bbl. per hour. Pay zone is the Aux Vases sand with saturation at 1,506-12 ft. Total depth is 1,519 ft. with hole open below 1,498 ft.

The third pay zone, the St. Louis lime, for the new Elnora pool, south of Elnora in northwestern Daviess County, Indiana, has been opened with a 96-bbl. pumper completed by Harrison Eiteljorg at his 1 Sims, SE SE NW 35-5n-6w. The pay is at 1,010-20 ft., to which the hole was plugged back after being drilled to 1,080 ft. The discovery well, completed late last year, produces from Salem lime, a slightly deeper zone. Since then, production also has been proved in the shallower McClosky section.

Western Franklin County, Illinois, has a new pool with the completion by LaGrange Petroleum Co, of its 1-B Harrison, NWc SW 24-6s-1e, just north of the town of Christopher. The well pumped 12 bbl. of net oil from O'Hara lime at 2,670-81 ft. Pay zone was treated with 500 gal. of acid. Total depth of the hole is 2,819 ft.

C. E. Lange & Son opened a new producing area in the Bowling Green district, Warren County, western Kentucky, with the completion of their 1 Hunt flowing 1½ bbl. of oil per hour from Devonian lime at 550-66 ft. The zone was shot with 40 qt. of nitro.

ILLINOIS WILDCAT FAILURES

Hamilton County: Dale Hopkins 1 Brooks, SW SE SW 36-5s-5e, dry, TD 3,409 ft.

Macoupin County: W. O. Laswell Drilling Co. 1-A Ecker, NW NW NE 2-8n-8w, dry, TD 440 ft.

Wayne County: National Petroleum Co. 1 Billington, SE NE NE 29-1n-7e, dry, TD 3,269 ft.

INDIANA WILDCAT FAILURES

Gibson County: Emil Kucera 1 Hollis, NE NE SE 1-3s-11w, dry, TD 1,944 ft.

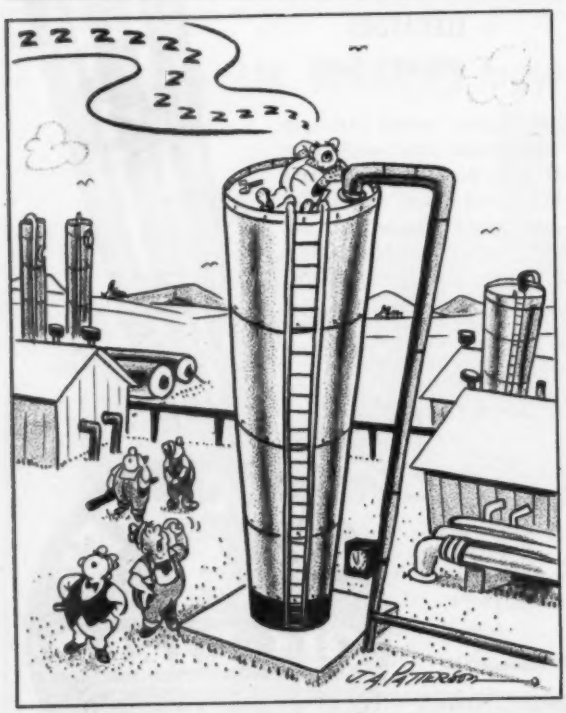
Posey County: Ashland Oil & Refining Co. 1 Grossman, NW NE NW 25-6s-12w, dry, TD 2,751 ft.

Vigo County: C. B. Mansfield 1 Francis, SW NE SE 6-10n-9w, dry, TD 2,226 ft.

EASTERN KENTUCKY

ASHLAND.—In Fleming County, 20-V-70, Walter Kline et al are shut down at 1,656 ft., approximately 80 ft. in the Knox dolomite formation. Hole is standing practically full of water but operators plan to dry up hole and then drill deeper. Test is on James Bashford acreage south of Hillsboro.

In Rowan County, 3-T-72, and ½ mile north of town of Farmers, J. Frank Hinkle has a dry hole at 525 ft. after testing Corniferous lime with only small show of gas. Test was several miles southwest of Triplett gas field in western Rowan County. Test was on farm of D. C. Caudill.



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Canadian Fields

Testing Continues on Wildcat East of Leduc

CALGARY.—The wildcat well located about 3½ miles east of Leduc oil field which struck gas and oil in a Devonian dolomite some 460 ft. deeper than the D3 zone of Leduc has been deepened and further tested to confirm its rating as a discovery. The well, Octave 1, in LSD 8, 5-50-25w4, was drilled by Octave Oils, Ltd., Edmonton independent.

On latest 8-hour flow test through a 5/64-in. choke, Octave's well produced oil at a rate of 3½ bbl. hourly, or 84 bbl. per day, with gas-oil ratio estimated between 600 and 700 cu. ft. per bbl. There was no water. Testing is being continued. Open for production is a 1-ft. perforated interval in the casing at 5,782-83 ft. Pressures during latest test were about 1,000 psi. on the casing and 750 psi. on the tubing.

In recent days, under varying test conditions, gravity of the oil recovered has ranged from 50.6° to 58.6°, compared with gravity of 43.0° for the oil recovered from pipe in drill-stem tests a month ago, and gravity of about 39.0° for the crude from D2 and D3 zones in the main Leduc-Devonian field.

Extended work on the well, including electrolog, Microlog, and radioactivity log, now indicate that the Octave well topped porous and permeable dolomite reef material at 5,777 ft., or 3,444 ft. below sea level. Various tests indicate that about 10 ft. in top of the reef is productive, largely natural gas in the top portion and oil and gas in the lower portion. The oil-water line is apparently at 5,787 ft., 3,454 ft. subsea, some 430 ft. lower than the water line in D3 reef at Leduc.

Socony-Vacuum Exploration Co. found D3 zone of Devonian at its Duhamel 20-4 well and ran two drill-stem tests in that horizon. The well is located in the Camrose area about 85 miles southeast of Edmonton. Small natural-gas flow rates were obtained during drill-stem tests and oil recovery ranging from 120 to 720 ft. was also found in the pipe. The water line was also encountered on a later test. Crew is now running electrolog preliminary to deciding on completion procedure at the well that had assured D2 Devonian oil production.

Duhamel 20-4 is located in LSD 4, 20-45-21w4, about ¼ mile north of Socony-Flint 1 dual-zone oil-discovery well. Initial D3 test was run at 4,795-4,810 ft., with small unmeasured gas flow hitting the surface 42 minutes after valve was opened. Pipe recovery was 120 ft. of oil in 1 hour Second test, at 4,800-15 ft., gave a gas flow measured at 60,000 cu. ft. daily plus a 1-hour pipe recovery consisting of 720 ft. of oil and 60 ft. of salt water. Hole was carried down to 4,845 ft. prior to running electrolog.

Best D2-zone test at Duhamel 20-4 was run at 4,488-4,518 ft., with oil reaching the surface 44 minutes after valve was opened and flowing at rate of 864 bbl. daily. Gas flow rate was 198,000 cu. ft. daily.

California-Standard Co. has spudded an exploratory venture in the Spotted Lake-Bashaw area of central Alberta. The new test is in an area where a considerable number of wildcats have been drilled. Although the Devonian reef has been found at several of the ventures, as yet commercial oil production has not been found at any of the test wells.

The new start is Cal-Standard-Spotted Lake 4-21, in LSD 4, 21-41-22w4, 1¾ miles northwest of the company's 3-15 abandonment and 2 miles north of Spotted Lake. The Transcontinental-Westlock 1 wildcat was drilled 2¾ miles due north of the new start. The well will be a test of all horizons down to and including the D3 Devonian equivalent.

Manitoba.—Imperial Oil has secured a license from the provincial government to drill a test for oil and gas, near Birtle in southwestern Manitoba, and will start work about the middle of March. Birtle is about 30 miles north of Virden, where California-Standard recently encountered free oil.

WILDCAT FAILURES

Imperial-Belloy 1, LSD 15, 34-77-1w6, TD 8,561 ft.

Great Plains-Seaboard-Pelican Lake 1, LSD 10, 9-80-19w4, TD 2,123 ft.

EASTERN CANADA

James Bay.—Hon. W. S. Gemmell, Provincial Minister of Mines for Ontario, has announced that the government will continue oil survey work in the James Bay area. Prospecting is now centered on a test at Pisquochi Point on James Bay, 40 miles north of Moose Factory. While results have been not too encouraging, there is a large area relatively unexplored. This is the third test to be drilled by the government. Private interests are also starting to drill in this section this year.

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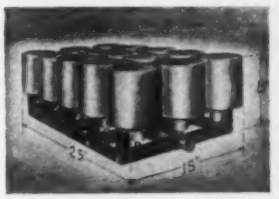

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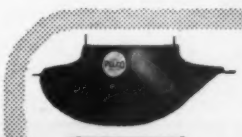

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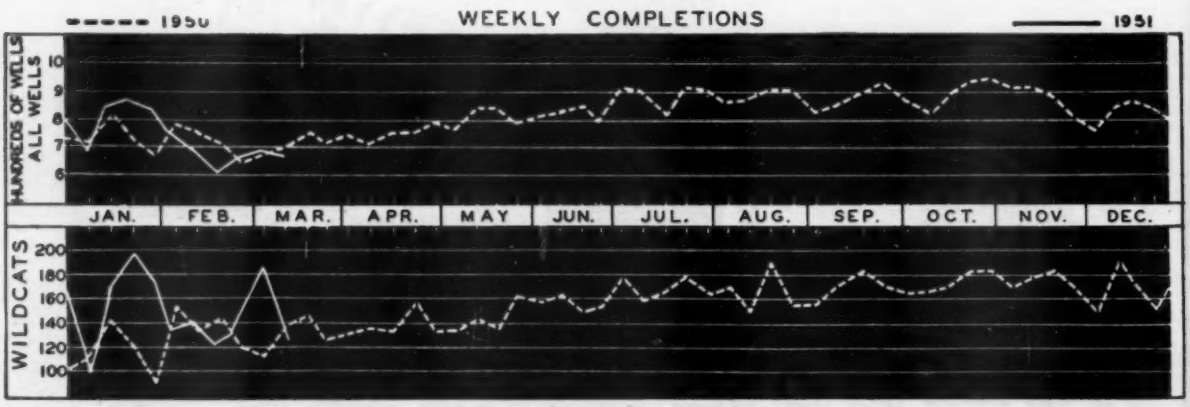
CURRENT STATISTICS

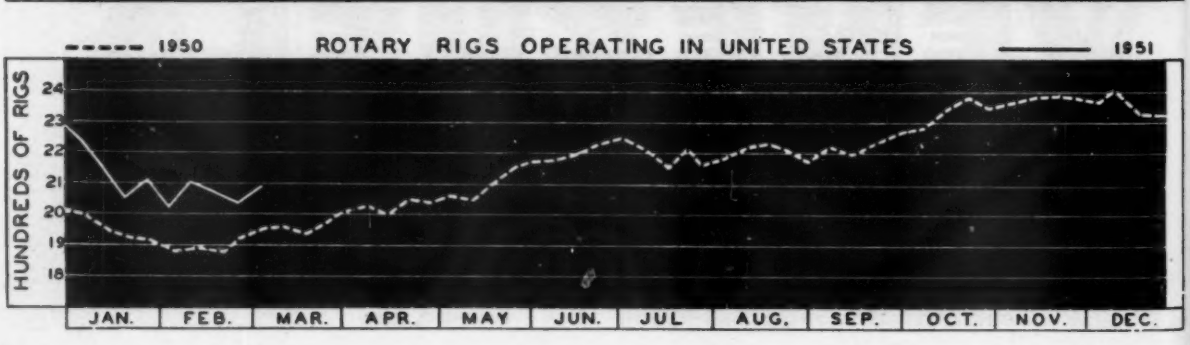
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED MARCH 10, 1951

	Total of all wells					Mar. 10		Wildcat completions and discoveries					Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	9	5	0	*4	13,103	73	118	0	0	0	0	0	0	0	0	0	0
Pennsylvania	18	3	7	†8	36,142	148	212	0	0	0	0	0	0	0	0	1	1
West Virginia	6	1	4	1	17,901	116	117	0	0	0	0	0	0	0	3	2	5
Ohio	11	5	0	‡6	30,753	145	169	0	0	0	0	0	1	0	2	5	8
Indiana	10	2	0	8	19,060	190	190	0	0	0	3	3	3	0	1	43	47
Kentucky	6	3	2	1	9,839	142	148	0	0	0	0	0	2	0	0	19	21
Illinois	15	6	1	8	34,440	348	395	0	0	0	3	3	9	0	0	51	60
Michigan	12	4	0	8	31,100	120	148	1	0	0	7	8	1	0	2	48	51
Kansas	64	34	1	29	218,335	764	615	0	0	0	12	12	30	0	2	139	171
Nebraska	3	0	0	3	13,000	57	14	0	0	0	2	2	2	0	1	24	27
Oklahoma	95	56	2	‡37	377,615	1,007	907	6	0	0	3	9	41	0	5	120	166
Texas	311	200	6	105	1,375,914	3,006	2,897	7	1	1	61	70	114	13	16	523	666
North Central (Dist. 7-B & 9)	96	56	2	38	289,802	880	859	4	0	1	18	23	54	0	1	203	258
West (Dist. 7-C & 8)	97	75	0	22	542,802	926	854	3	0	0	12	15	26	2	0	113	141
Panhandle (Dist. 10)	5	2	3	0	16,444	142	221	0	0	0	0	0	0	0	0	5	5
Eastern (Dist. 5, 6, & 6-P)	28	16	0	12	127,388	209	209	0	0	0	10	10	0	0	0	42	42
Gulf Coast (Dist. 2 & 3)	30	16	1	13	186,794	424	392	0	0	0	9	9	20	7	12	74	113
Southwest (Dist. 1 & 4)	55	35	0	20	212,684	425	362	0	1	0	12	13	14	4	3	86	107
Louisiana	31	17	4	10	209,977	380	467	1	0	0	3	4	11	0	1	51	63
Northern	13	10	3	0	48,631	176	245	1	0	0	0	1	3	0	0	26	29
Southern	18	7	1	10	161,346	204	222	0	0	0	3	3	8	0	1	25	34
Arkansas	3	2	0	1	11,288	72	69	0	0	0	0	0	1	0	0	10	11
Mississippi	5	1	0	4	28,421	43	57	0	0	0	1	1	3	1	0	17	21
Southeastern States	0	0	0	0	0	13	12	0	0	0	0	0	0	0	0	2	2
Montana	0	0	0	0	0	24	29	0	0	0	0	0	0	0	0	2	2
Wyoming	12	7	2	3	69,905	119	114	1	0	0	1	2	3	0	0	20	23
Colorado-Utah	5	2	0	3	21,175	46	17	1	0	0	3	4	1	0	0	26	27
New Mexico	9	5	1	3	56,307	123	136	0	0	0	0	0	2	0	4	13	19
California	41	32	0	‡9	177,682	353	339	0	0	0	7	7	7	0	1	73	81
Miscellaneous (Idaho)	1	0	0	1	12,844	8	1	0	0	0	1	1	0	0	3	5	8
Total United States	667	385	30	252	2,764,806	7,297	7,171	17	1	1	107	126	231	14	41	1,194	1,480
Total previous week	691	359	53	279	2,846,952	....	....	27	3	7	148	185	214	13	40	1,087	1,354
Total March 10, 1950	694	408	37	249	2,540,716	....	....	20	1	6	112	139	180	14	47	1,034	1,275

Service wells included: *4, †8, ‡1.





DAILY AVERAGE PRODUCTION FOR WEEK

	Mar. 10 crude oil	B. of M. Mar. demand	Mar. 3 crude oil
Alabama	3,100	2,400	2,500
Arkansas	80,550	88,000	80,250
California	965,500	970,000	956,800
Colorado	78,000	78,000	77,200
Eastern	63,525	66,000	58,700
Florida	1,575	1,600	1,700
Illinois	165,300	166,000	161,700
Indiana	27,100	31,000	26,800
Kansas	311,650	306,000	317,100
Kentucky	28,700	31,000	28,200
Louisiana	613,350	632,000	608,400
North Louisiana	117,350	.....	116,400
South Louisiana	496,000	.....	492,000
Michigan	38,900	45,000	40,800
Mississippi	101,950	114,000	105,550
Montana	23,100	23,000	22,900
Nebraska	10,050	8,000	10,000
New Mexico	141,000	140,000	138,325
Oklahoma	504,500	495,000	508,850
Texas	2,616,550	2,460,000	2,584,500
Dist. 1 (Southwest)	32,375	.....	32,300
Dist. 2 (Southwest)	157,100	.....	154,200
Dist. 4 (Southwest)	244,150	.....	241,675
Dist. 3 (Gulf Coast)	463,900	.....	459,950
Dist. 5 (Eastern)	48,650	.....	47,500
Dist. 6 (Eastern)	105,725	.....	104,625
East Texas field	271,000	.....	271,575
Dist. 7-C (West)	84,950	.....	81,300
Dist. 8 (West)	892,500	.....	876,775
Dist. 7-B (W. Central)	79,200	.....	78,175
Dist. 9 (N. Central)	147,400	.....	146,850
Dist. 10 (Panhandle)	89,000	.....	89,575
Utah	3,400	5,000	3,500
Wyoming	190,500	183,000	190,100
Total United States	*5,968,300	5,845,000	5,923,875
Change from previous week, up	44,425		
Canada	76,570	.....	81,525

Total U. S. production January 1-March 10 .... †417,543,430 bbl.
Same period last year (crude plus cond.) .... 341,628,303 bbl.

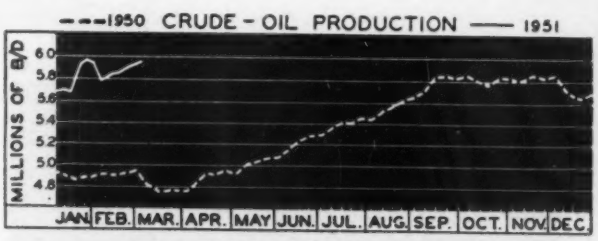
*Not including 108,475 bbl. condensate. †Including 7,260,260 bbl. condensate.

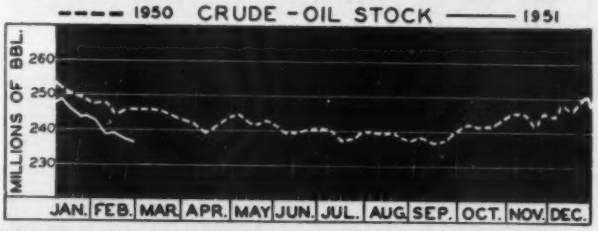
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

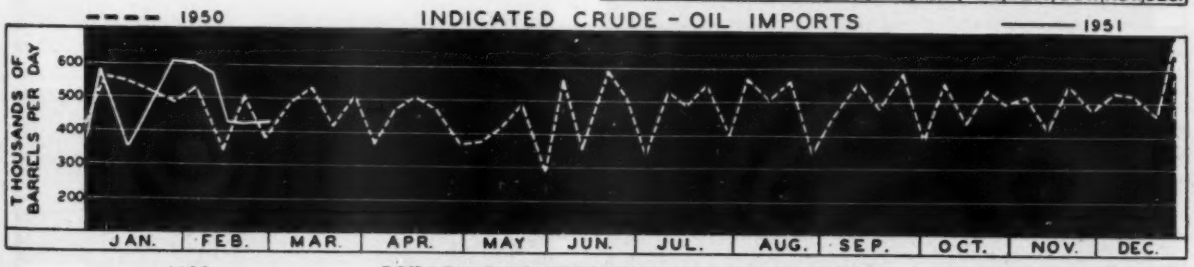
(Thousands of barrels)

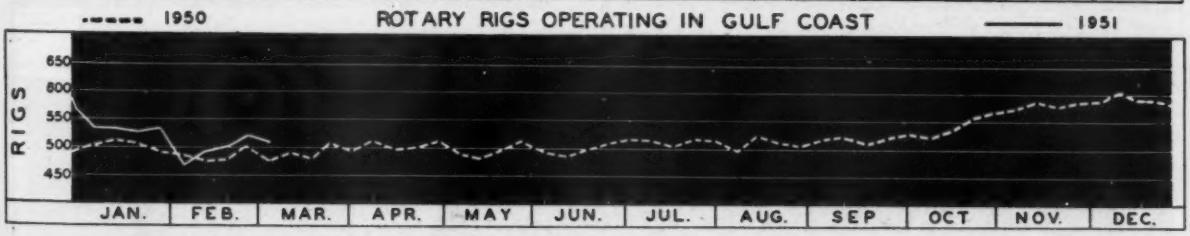
	Mar. 3, 1951	Feb. 24, 1951	Mar. 4, 1950
Pennsylvania Grade	2,081	2,043	2,776
Other Appalachian	1,284	1,396	1,705
Illinois, Indiana, Michigan	9,327	10,072	10,838
Arkansas	2,676	2,632	3,103
Louisiana	14,247	13,895	15,691
North	3,132	2,860	3,673
Gulf	11,115	11,035	12,018
Mississippi	3,029	3,040	2,420
New Mexico	6,975	6,918	7,443
Oklahoma and Kansas	37,810	37,713	34,839
Texas	110,785	110,474	109,170
East Texas	14,247	13,910	14,849
West Texas	43,654	43,074	38,137
Texas Gulf	25,294	25,855	29,399
Other Texas	27,590	27,635	26,785
Rocky Mountain	12,486	12,309	13,604
California	30,459	30,720	37,814
Foreign	5,649	5,942	7,051
Total	236,808	237,204	246,454

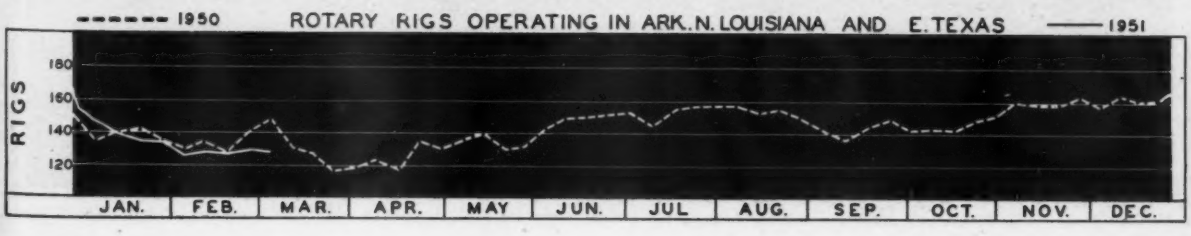
*Bureau of Mines.









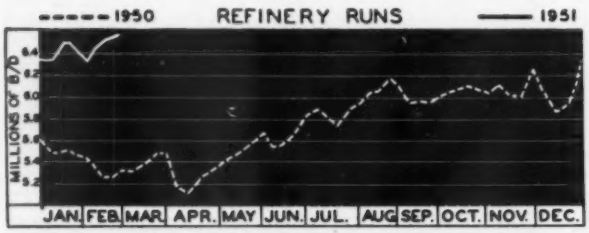


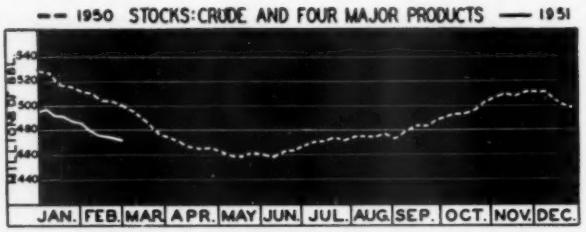
A.P.I. REFINERY REPORT, MARCH 3

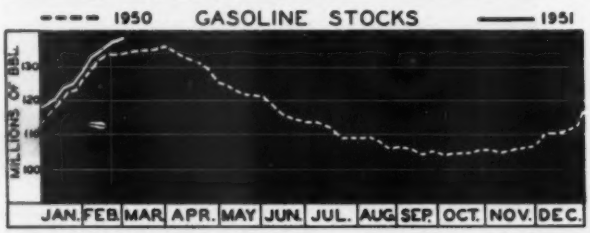
(Thousands of barrels)

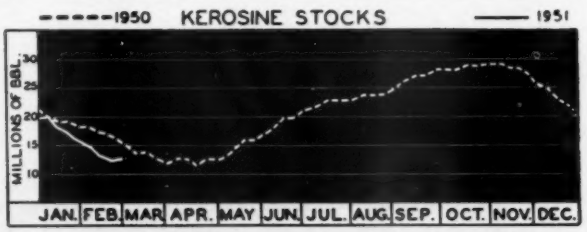
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, March 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,018	391.3	63.1	252.6	227.0	25,979	5,234	13,811	8,303	810	330.6	30.2	182.6	204.3
Appalachian:														
District 1	93	40.1	3.3	17.3	14.0	2,713	166	467	262	91	40.1	7.6	13.3	10.4
District 2	81	33.7	6.1	9.3	20.7	1,196	64	106	125	69	29.9	4.5	11.3	18.3
Ind., Ill., Ky.	1,230	613.0	85.4	237.4	177.1	31,279	2,817	6,793	2,855	1,032	526.8	67.4	169.2	191.9
Okla., Kans., Mo.	565	293.3	19.6	138.8	77.9	15,307	561	5,887	1,018	426	235.8	18.2	89.4	54.4
Inland Texas	242	147.9	10.1	40.6	48.9	4,430	342	526	746	199	141.2	11.0	26.7	44.1
Texas Gulf Coast	1,543	635.7	139.3	367.1	275.0	22,917	1,617	6,459	4,270	1,234	579.0	102.6	209.4	216.9
La. Gulf Coast	498	224.7	77.9	115.3	76.1	9,083	1,084	2,594	2,205	431	209.3	56.6	92.7	50.3
N. La. and Ark.	85	31.1	8.6	19.1	8.4	2,924	191	827	83	64	25.8	6.8	12.8	13.6
Rocky Mountain:														
New Mexico	15	7.9	.1	2.9	2.9	113	25	66	32	12	6.3	.4	1.9	2.9
Other Rocky Mtn.	223	102.1	5.9	38.3	42.7	5,329	227	1,245	694	170	79.5	6.1	32.0	35.7
California	1,003	406.2	14.3	149.4	405.0	16,939	466	8,779	17,675	798	334.5	14.4	96.4	311.0
March 3, 1951	6,596	2,927.0	434.7	1,388.1	1,375.7	138,209	12,794	47,560	38,268	5,336	2,538.8	325.8	937.7	1,153.8
February 24, 1951	6,524	2,973.6	376.0	1,506.4	1,353.0	136,870	12,527	48,764	38,995	.....	.....	.....	.....	.....
March 4, 1950	5,316	2,529.6	311.6	1,006.9	1,162.9	134,208	15,466	51,670	46,086	.....	.....	.....	.....	.....

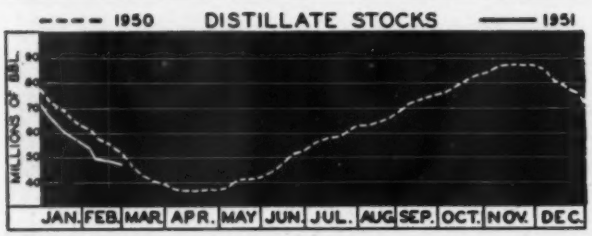
*At refineries including natural blended. †Finished and unfinished.

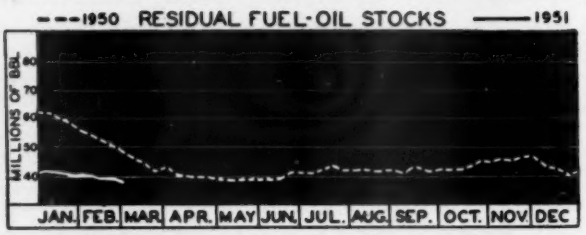


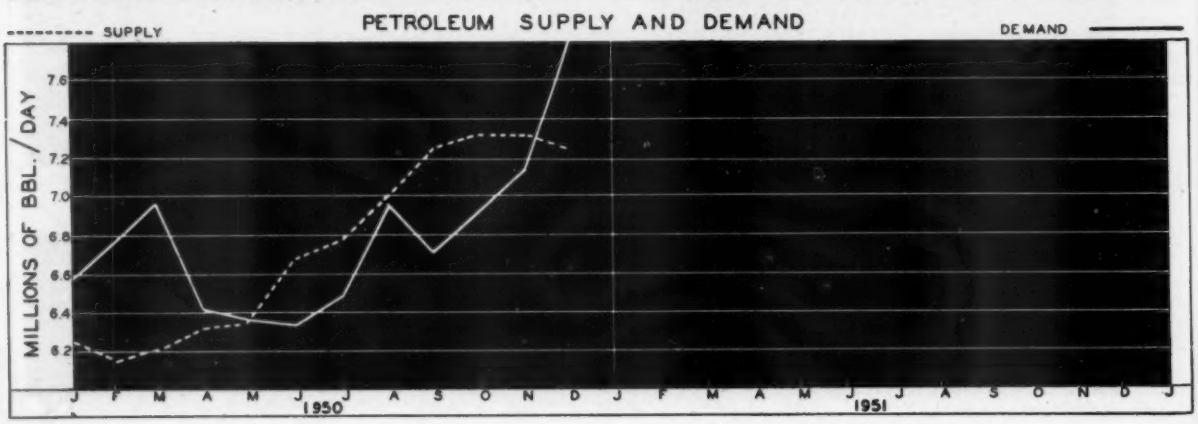












CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma. Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

INDICATED refinery demand is showing a near-normal seasonal trend with some increase in demand for gasoline and declines in purchases of kerosine and distillate fuels. Indicated refinery demand for gasoline in the 3-week period ended March 3 was about 17.5 per cent greater than in the same period last year. Kerosine demand was up about 20 per cent while distillate showed a gain of 18.3 per cent.

Since heating-oil demands were abnormally high in March 1950 because of the cold weather, comparisons of current demands with the same week last year may show smaller percentage gains than at the season's peak.

Some suppliers and marketers are planning for the coming gasoline season on a basis of an estimated increase in demand of about 10 per cent. Withdrawals from storage throughout the season last year amounted to about 28,000,000 bbl. Stocks at the beginning of the season this year may be high enough to permit withdrawals of 35,000,000 bbl. However, this additional material in storage represents only a little more than 1 per cent of total gasoline demand forecast for the 6-month season from April through September. If gasoline demands reach the expected levels, both refinery runs and percentage yields will be greater than last year.

Residual fuel is the only major product classified as tight in most of the important markets. Deliveries from refineries are at about last year's level since sales are limited to current production while stock reductions continued through most of last March.

Possible shifting of tankers from the Gulf-East Coast trade is indicated by the fixture of a clean tanker for a Gulf-European trip at 205 per cent over the Maritime Commission base. Gulf-East Coast rates are frozen at MC plus 200 per cent.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of March 12, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅛-11½	13.5-13.75	11½-12
42-44 w.w. kerosine	9¼-9⅜	10-10.1	8¾-9
No. 2 straw fuel oil	8⅜-8⅝	9-9.25	7¾-8
No 6 residual	$1.80-1.90	$2.25-2.30	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6⅜	5⅞	6⅛
Grade 18-55	7.65	7.15	7.40

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

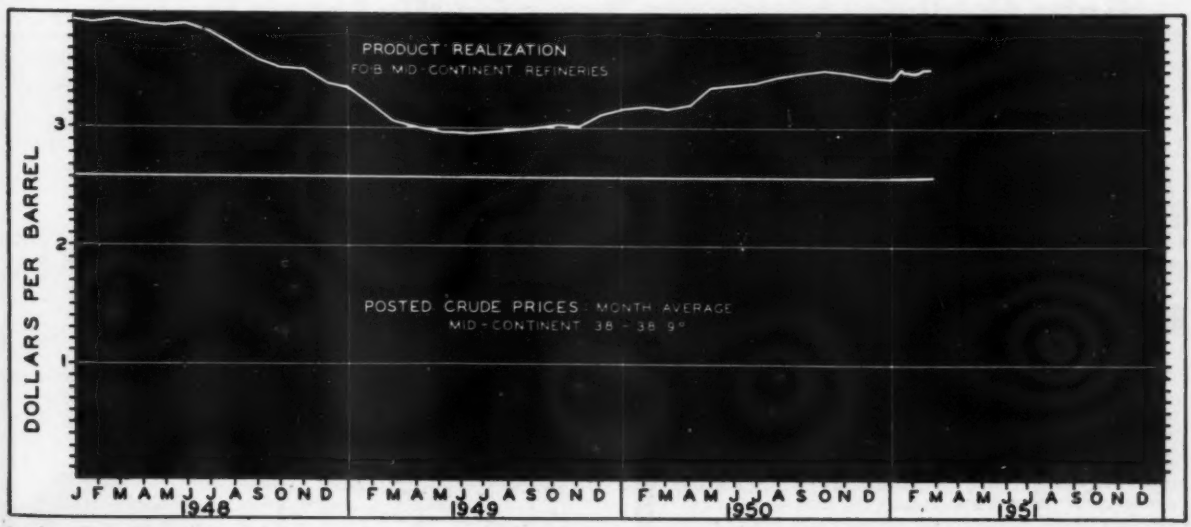
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.0


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.52 for week ended March 3, $3.52 for previous week, and $3.22 for March 1950.

Oklahoma Fields

(Continued from page 133)

OKLAHOMA SUCCESSFUL WILDCATS

Lincoln County: Allied Materials 2 Keegan "C," SW SE SE 5-13n-5e, flowed 244 bbl. 41°-gravity oil per day from Prue at 3,485-3,513 ft., TD; Hogshooter 2,284 ft., Layton 2,384 ft., Checkerboard 2,649 ft., conglomerate 2,664 ft., Oswego 3,461 ft., elev. 796 ft.

Noble County: Bay Petroleum Corp. 1 Henn. NE NW NE 32-20n-2w, pumped 53 bbl. 46°-gravity oil per day from Avant at 3,610-20 ft., TD 5,201 ft., Oread 3,002 ft., Layton 4,010 ft., Checkerboard 4,458 ft., Oswego 4,610 ft., Viola 4,960 ft., first Wilcox 5,602 ft., second Wilcox 5,182 ft., elev. 1,145 ft., new pay in Lucien.

Okfuskee County: Herndon Drilling 1 Smith, SW NE SE 26-13n-8e, pumped 25 bbl. oil per day from Union Valley-Cromwell at 2,524-30 ft., TD 3,566 ft., Checkerboard marl 1,151 ft., Checkerboard lime 2,140 ft., Oswego 2,165 ft., coal 2,308 ft., Senora sand 2,388 ft., upper Earlsboro 2,668 ft., lower Earlsboro 2,735 ft., Inola 2,923 ft., Bartlesville 2,960 ft., Booch 3,269 ft., lower Gilcrease 3,476 ft.

Payne County: Kerr-Dudley & Co., and Laughlin Bros. 1 Stanoline-Amerada, NE SW SW 27-18n-4e, flowed 240 bbl. 47°-gravity oil per day from Wilcox at 4,012-25 ft., TD; Hogshooter 2,460 ft., Layton 2,490 ft., Checkerboard 2,781 ft., Big lime 3,183 ft., Oswego 3,229 ft., Verdigris 3,345 ft., lime 3,493 ft., Red Fork 3,524 ft.

Pottawatomie County: Buttram Petroleum Co. 1 School Land, SE SE NE 36-7n-pumped 16 bbl. 38°-gravity oil per day from Calvin at 4,314-25 ft., TD 4,341 ft. Belle City 2,945 ft., Hogshooter 3,280 ft., Layton lime 3,356 ft., Checkerboard 3,560 ft., Wewoka 3,745 ft., elev. 953 ft.

Seminole County: Briscoe, Inc., 1 Casey, NW SE SE 24-6n-7e, flowed 140 bbl. 39°-gravity oil per day from Gilcrease at 2,770-85 ft., TD; Calvin 1,382 ft., Booch 2,488 ft., elev. 791 ft.

OKLAHOMA WILDCAT FAILURES

Kay County: Helmerich & Payne, Inc. 1 Arnette, SE NE NW 17-29n-3e, dry, TD 3,319 ft., Layton 2,512 ft., Senora 2,796 ft., Big lime-Oswego 2,910 ft., Prue 3,044 ft., Verdigris 3,112 ft., Skinner 3,134 ft., Burbank 3,242 ft., Mississippi chat 3,303 ft.

Noble County: Mazda Oil Co. 1 Marshall, SW SW NE 27-24n-1e, dry, TD 4,430 ft., Tonkawa lime 2,250 ft., Layton 3,274 ft., Skinner 4,122 ft., Red Fork 4,200 ft., Bartlesville 4,336 ft., Mississippi chat 4,388 ft.

Stephens County: McMahon, Inc. 1 Click, SE SE NW 23-1s-8w, dry, TD 4,330 ft., Arbuckle 4,295 ft., geological wildcat.

North Central Texas

(Continued from page 130)

was 160 ft. of oil and 60 ft. of mud. It was drilling ahead.

In Jack County, Coston & Cline 2 T. H. Cherryhomes completed for 130 bbl. of 43°-gravity oil a day, flowing through 16/64-in. choke from perforations at 5,516-31 ft. The wildcat discovery is 7 miles southeast of Jacksboro in the J. Kuykendall Survey.

In southern Wise County, almost on the Wise-Parker county line, Kingwood Oil Co. 1 J. H. Peel completed as a Caddo discovery, flowing 183.8 bbl. of 40°-gravity oil a day from pay between 3,830-40 ft. Location is 1½ miles northeast of Buz Caddo field and about 2½ miles north of Springtown.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Coleman County: Ray E. Davis 1 C. D. Bruce, J. Scott Sur., 3½ mi. W Santa Anna, TD 1,849 ft., elev. 1,643 ft., pay 1,836 ft., IP flowed 80 bbl. 45°-grav. oil a day, 14/64-in. choke, TP 50 psi., GOR 275 cu. ft.

Eastland County: Fred Manning, Inc. 1 Lauderdale, 6-6-ELRR, 3½ mi. S Nimrod, TD 3,987 ft., PB 2,984 ft., elev. 1,730 ft., Caddo pay 2,720-35 ft., IP 2,000,000 cu. ft. gas, SIP 1,070 psi.

Jack County: Russell Maguire 1 Cantrell, SPRR Sur., 9½ mi. NE Jermyn, TD 4,723 ft. in conglomerate pay 4,694 ft., IP pumped 97 bbl. oil in 19 hr.

Star Oil Co. et al 1 M. E. Munson, BB&F Sur. 3, 7 mi. SE Bryson, TD 4,785 ft., pay 4,778 ft., IP flowed 47 bbl. 44°-grav. oil a day, ¼-in. choke, TP 125 psi., GOR 1,525 cu. ft.

Montague County: Ralph Myers Contracting Corp. 1 J. S. Woods, W. J. Wells Sur., 2½ mi. NW Nocona, TD 4,500 ft., pay 4,490 ft., IP pumped 82 bbl. 42°-grav. oil a day.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Ralph Myers 1 J. H. Robertson, Club Ranch, 9 mi. SW Archer City, dry, TD 1,442 ft.

Neeld & Hood Drilling Co. 1-A E. E. Threet, M. Pickens Sur., 4 mi. S Archer City, dry, TD 600 ft.

Coleman County: Anzac Oil Corp. 2 Walter Scarbrough, M. Hunt Sur., 5 mi. SW Santa Anna, dry, TD 1,904 ft., elev. 1,517 ft., Gardner 1,844 ft.

Haskell County: Drilling & Exploration Co. 1 A. E. Clark, C. B. Clough Sur., 3 mi. NW Stamford, dry, TD 5,516 ft., elev. 1,507 ft., upper Swastika 2,405 ft., lower Swastika 2,537 ft., reef 3,130 ft., Caddo 5,115 ft., Ellenburger 5,474 ft.

Jones County: Lester, Duffield and Billups 1 L. E. C. Boyd, J. W. McKissick Sur., 7 mi. SW Anson, dry, TD 3,570 ft., elev. 1,710 ft., Flippen 2,525 ft., Hope 2,712 ft., Gunsight 2,850 ft., Swastika 2,952 ft.

Mills County: Pure Oil Co. 1 W. A. Triplett, Nacogdoches University Sur., 4 mi. SE Zephyr, dry, TD 2,124 ft., Marble Falls 1,787 ft., Mississippian 1,804 ft., Ellenburger 2,001 ft.

Palo Pinto County: J. B. Betts 1 Mrs. Helen Johnson, G. N. Kincaid Sur., 6 mi. W Graford, dry, TD 4,370 ft.

Stephens County: Grey Oil Co. et al 1 Newham, 27-6-T&P, 5 mi. S Caddo, dry, TD 2,139 ft.

W. J. Rhodes 1 W. J. Rosenquest, 54-5-T&P, 14 mi. SE Breckenridge, dry, TD 3,070 ft.

Stonewall County: F. Kirk Johnson 1 B. B. Clark, 232-D-H&TC, 6 mi. W Aspermont, dry, TD 6,572 ft., elev. 1,910 ft., Canyon 4,791 ft., Strawn 5,745 ft., Chappel 6,495 ft., Ellenburger 6,560 ft.

Oxford Drilling Co. 1 J. W. Hines, 171-BBB&C Sur., 8 mi. NE Hamlin, dry, TD 4,066 ft., King 3,272 ft., Swastika 3,409 ft.

Taylor County: U. M. Harrison 3 Clyde Sears Est., 162-64-H&TC, 3 mi. NE Shep, dry, TD 4,790 ft., elev. 2,270 ft., reef 4,004 ft.

McAlester Fuel Co. 1 J. R. Hester Est., J. Wm. Page Sur. 123, 2½ mi. E. Merkell, dry, TD 2,500 ft., elev. 1,822 ft., Dothan 2,090 ft., Flippen 2,480 ft.

West Central Drilling Co. 1 Triplett, J. T. McComas Sur., 1¼ mi. W Buffalo Gap, dry, TD 4,980 ft., elev. 1,928 ft., Flippen 2,210 ft., Hope 2,325 ft., Caddo 4,584 ft., Ellenburger 4,929 ft.

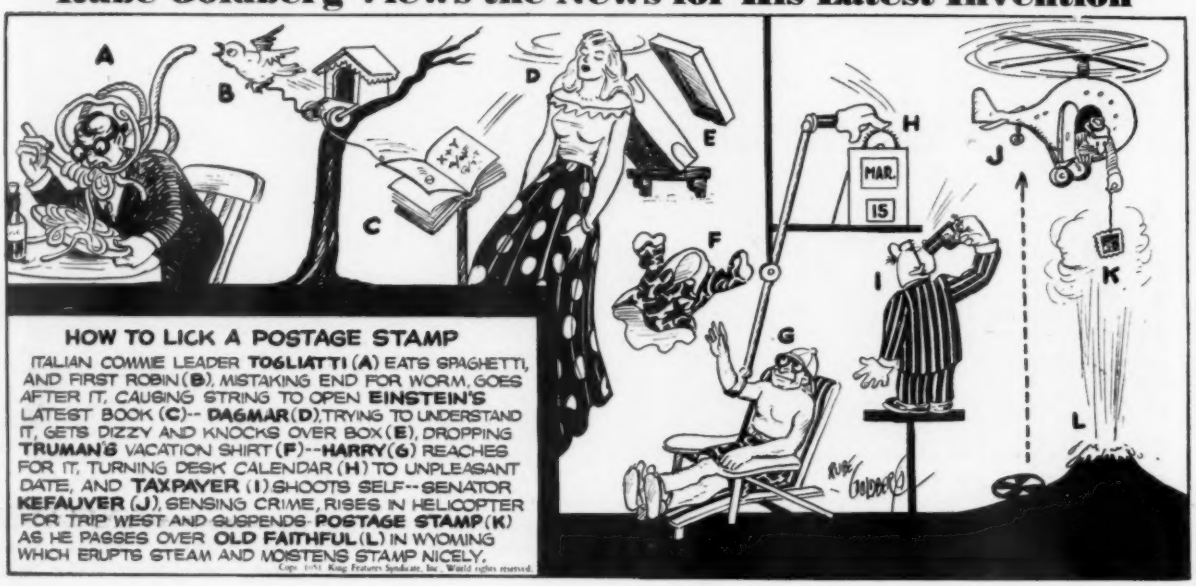
Throckmorton County: Dub-Wood Drilling Co. 1 Helen C. Poage, TE&L Sur., 4 mi. W Woodson, dry, TD 1,812 ft.

Mobile, Inc. 1-C Everett-Roberts-Montgomery, TE&L Sur., 8 mi. S Throckmorton, dry, TD 1,610 ft.

Wichita County: John & Pat O'Neil 1-D Waggoner, 26-5-H&TC, 3 mi. N Electra, dry, TD 1,850 ft.

Young County: Warren Oil Corp. 1 J. W. Cloud, TE&L Sur., 5½ mi. SW Murray, dry, TD 4,674 ft., Caddo 3,612 ft., Mississippian 4,571 ft.

Rube Goldberg Views the News for His Latest Invention


A
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HOW TO LICK A POSTAGE STAMP
ITALIAN COMMIE LEADER TOGLIATTI (A) EATS SPAGHETTI, AND FIRST ROBIN (B), MISTAKING END FOR WORM, GOES AFTER IT, CAUSING STRING TO OPEN EINSTEIN'S LATEST BOOK (C)-- DAGMAR (D), TRYING TO UNDERSTAND IT, GETS DIZZY AND KNOCKS OVER BOX (E), DROPPING TRUMAN'S VACATION SHIRT (F)--HARRY (G) REACHES FOR IT, TURNING DESK CALENDAR (H) TO UNPLEASANT DATE, AND TAXPAYER (I) SHOOTS SELF--SENATOR KEFAUVER (J), SENSING CRIME, RISES IN HELICOPTER FOR TRIP WEST AND SUSPENDS POSTAGE STAMP (K) AS HE PASSES OVER OLD FAITHFUL (L) IN WYOMING WHICH ERUPTS STEAM AND MOISTENS STAMP NICELY.
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EQUIPMENT MEN . . . in the News

Worthington Names Fraser Midwest Sales Manager

A. W. FRASER

A. William Fraser, formerly general European manager, has been appointed Midwest sales manager of Worthington Pump & Machinery Corp., according to an announcement by W. H. Feldman, vice president in charge of sales. Fraser will direct the sales of Chicago, St. Paul, Kansas City, and St. Louis offices, making his headquarters in Chicago.

After graduating from Northeastern University with a degree of bachelor of mechanical engineering, Fraser joined Worthington training course in 1929 and became sales engineer in various Worthington offices and plants throughout the country. In 1937 he became Chicago district manager and in 1945 general European manager.

Swain Opens Agency In Whittier, Calif.

L. J. Swain, formerly with Los Angeles agency of Martin R. Klitten Co. Inc., has announced the opening of his own advertising agency in Whittier, Calif.

Swain was first employed by Dozier-Graham-Eastman, Los Angeles, as a copywriter, working on oil-tool and other industrial advertising accounts. Later he acted as copywriter-account executive for the same firm. In 1947 he became associated with Lester C. Nielson Co., Huntington Park, Calif., also in the capacity of account executive.

The new firm will be known as L. J. Swain, Advertising.

Gama Industries, Inc., Now Nicolet Industries, Inc.

The manufacturer of Gama asbestos pipe-line felt has announced a change in corporate name from Gama Industries, Inc., to Nicolet Industries, Inc.; and the asbestos felt will be known as Nicolet asbestos pipe-line felt.

The asbestos-fiber mines in Province, Que., Canada, have always carried the name Nicolet Asbestos Mines, Ltd., and it was decided to carry this name of quality asbestos into the product. This felt, under the name of Gama asbestos pipe-line felt, has been used on many transcontinental pipe lines and by all types of applicators. It is a rugged inorganic shield that does not require the addition of hair or other organic matter for strength.

In addition to manufacturing asbestos felt, Nicolet manufactures other asbestos products and many metal products through their associated companies.

Distributor for Nicolet asbestos pipe-line felt is Middle West Coating & Supply Co.

Seabury Joins Sales Staff of Bingham Pump

D. G. SEABURY

David G. Seabury has joined the sales organization of Bingham Pump Co., Portland, Ore., in line with the company expansion program. Seabury, who has a B.E. degree in mechanical engineering from University of Southern California, will have San Francisco as his headquarters.

With his training and field experience, he will be well qualified to serve Bingham customers in that territory.

Welex Names Montrose To Board of Directors

M. E. Montrose, of Houston, vice president and member of the board of Hughes Tool Co., was elected to the board of directors of Welex Jet Services, Inc., at its annual stockholders' meeting held in Fort Worth on March 2.

Wick Appointed Assistant To Rockwell President

W. F. Rockwell, Jr., president of Rockwell Manufacturing Co., has announced the appointment of Paul A. Wick as assistant to the president.

Wick is a graduate of University of Dayton and the University of Pittsburgh Law School.

He joined the legal department of Rockwell in 1946 and became assistant secretary in 1948, the position he held until his present appointment.

Agency Announces Change In Company's Name

A change in the name of Wilhelm-Laughlin, Wilson & Associates has been announced by J. B. Wilson, president. In the future the advertising agency will be known as Laughlin, Wilson, Baxter & Persons.

Wilson said that no change in staff or service will be made. He listed new members of the board and stockholders as: Don L. Baxter, executive vice president of the Dallas division; Howard Persons, executive vice president of the New York division; William C. Bryan, vice president and treasurer in Houston; Earl M. Richards, vice president and secretary in Houston; Harry Congdon, vice president in Houston, and John M. White, vice president of the Memphis division.

Upton Heads Dallas Branch Of Pioneer Rubber Mills

O. D. Upton has been named district manager for Pioneer Rubber Mills, with new headquarters at Dallas.

Pioneer Rubber Mills manufactures a complete line of conveyor, elevator, and transmission belting; industrial hose; fire hose; packing; and other specialties.

In addition to the standard line, many Pioneer products have been developed especially for the petroleum industry.

Mid-Continent Opens New Store at Brownfield, Tex.

Mid-Continent Supply Co.'s newest field store, located at Brownfield, Tex., was formally opened February 9 with an estimated 1,500 guests attending.

Ken W. Davis, president of Mid-Continent, announced that the new store is completely stocked with the newest equipment available to the oil industry and is offering 24-hour service to the surrounding area.

At the same time he announced the appointment of A. A. Pike, former store manager at the company's Fullerton, Tex., store, as Brownfield store manager. Other personnel for the new store includes L. E. Baker as field salesman; B. C. Flores, from the Odessa store; M. H. Hughes, Jr., of

the Sundown, Tex., store; M. B. Harlan, Jr., and L. O. Lilly from the Fullerton store and Robert Schmidt as warehousemen.

Operating under the Mid-Continent West Texas-New Mexico division, the new store will be under the supervision of Division Manager T. P. Tarwater with W. W. Arnold as district manager.

Johnston is Mid-Continent Agent for S. C. Carter Co.

BLAINE JOHNSTON

Blaine Johnston, Dallas, has been named Mid-Continent distributor for S. C. Carter Co. of Los Angeles, manufacturers of Salentine Varicycle hydraulic pumping units. Johnston will operate under the name of S. C. Carter Varicycle Sales Co.

Johnston was formerly connected with International Derrick & Equipment Co. as derrick service representative; general manager for Johnston Hydraulic Rig Co., Longview, Tex.; and sales manager for L. R. Ward Co., Dallas. He received a degree in mechanical engineering from University of Southern California and also attended Southern Methodist University, Dallas.

Johnston is engaged in organizing and developing the South Texas territory. It is his plan to have a qualified sales, service and spare-parts representative in each area in the 10-state Mid-Continent area.

Schweers to Head General Machinery Sales for A-C

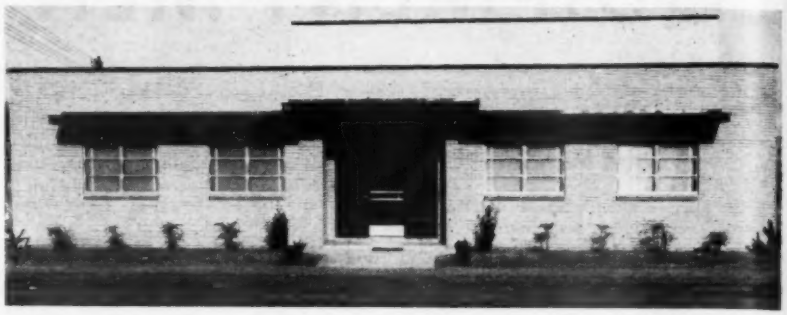
Chester W. Schweers has been named director of sales of Allis-Chalmers' general machinery division, according to an announcement by J. L. Singleton, vice president of the company's general-machinery division.

Schweers has been connected with the company's general-machinery division sales organization for more than 20 years. He joined Allis-Chalmers in 1930 and is an electrical engineering graduate of Texas A. & M. College.

He was assigned to the company's New Orleans district office as a sales representative in 1930. In 1942, he was named manager of the Houston office and served in that capacity until 1947, when he became manager of the Los Angeles district office. In March 1950 he was appointed manager of the New England region, a post he held until his latest appointment.

Merton M. York, since June 1950 manager of the Boston district office, has been named manager of the New England region to succeed Schweers.

Western Geophysical Occupies New Building



The Mid-Continent, Gulf Coast, and Eastern divisions of Western Geophysical Co. of America, have recently occupied this newly completed building at Shreveport, La. In addition to administration offices, the building features a machine and electronics shop for servicing geophysical equipment. Division operations are directed by Booth B. Strange, vice president.

Mack Appoints Rowold to New Sales Position

HENRY ROWOLD

Henry Rowold, a vice president of Mack Motor Truck Corp., has been appointed manager of Mack's distributor sales division, according to an announcement by H. W. Dodge, executive vice president of Mack Trucks, Inc.

Rowold's new duties embrace supervision of all Mack distributors in the United States, Canada, and Mexico. He has been with Mack since 1919 and was formerly manager of national accounts in New York.

Burns, Wharton Are New Directors for Trailmobile

Election of two new directors of The Trailmobile Co., manufacturers of commercial truck-trailers, has been announced by George M. Bunker, president, following a meeting of the company board of directors.

They are: William A. Burns, Jr., vice president and sales manager of the company; and J. B. Wharton, Jr., vice president and treasurer.

Burns heads up Trailmobile sales operations throughout the country through 29 factory sales branches in principal cities.

Wharton joined Trailmobile in March 1949 as vice president and treasurer, the position which he now occupies.

Ajax Iron Works Names West Texas Representative

Ajax Iron Works, Corry, Pa., has announced the appointment of George Elwood to represent the company in the West Texas territory, where he will be responsible for sales and service of the Ajax gas engine line.

Elwood attended University of Idaho prior to joining the Ohio sales division of National Supply Co. After 9 years with National, he became connected with Buckeye Supply Co. in a supervisory sales capacity, specializing in engines and pumpers.

Wasp Heads Petro-Chem Sales Engineering Division

Petro-Chem Development Co. has announced the appointment of Edward J. Wasp as chief process engineer of its sales engineering department.

Wasp has devoted the last 6 years to heat transfer, process problems, and furnace designing for the petroleum and chemical industries.

New Sales Manager Named By Alloy Steel Products Co.

Alloy Steel Products Co., Linden, N. J., has announced the appointment of Harold J. Bartlett as sales manager, with headquarters in Linden. Bartlett's entire business career has been devoted to the valve industry. After graduating from Armour Institute of Technology, he joined Crane Co., where he mainly specialized in the development and sale of corrosion-resisting valves and fittings. He was manager of Crane's sales for 10 years prior to his new post.

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$12.00 a column inch one issue . . .
10% Discount three or more issues.

EQUIPMENT FOR SALE

USED ROTARY AND CABLE TOOL DRILLING TOOLS, WIRE LINES, E. A. KELLY, BOX 861, OKLAHOMA CITY. PHONE 5-6407.

BUCYRUS CABLE Tool Spudder 36-L 1948 Model, perfect condition, 54 foot mast, dual cathead, dual pneumatic tired wheels. All tools from 24", all accessories. An-Son Petroleum Corp., First National Bldg., Oklahoma City, Okla. Phone 7-4497.

AVAILABLE for sale and immediate shipment line pipe, seamless and lapweld casing, tanks. Call or write Edco Pipe & Supply Company, Box 565, Drumright, Oklahoma.

FOR SALE: 24 tank car shells. Sizes ranging from 6' 6" x 25' 4" ¼" top 7/16" bottom plate single riveted, to 6' 4" x 32' 6" 3/8" top 7/16" bottom plate double riveted. 6 with 18" bolted man hole end. All in number one condition. Price $800.00 each loaded on either car or trucks. M. J. Regan, Coffeyville, Kans.

FOR SALE: Four WOK Waukesha engines with starting motors; 1—WAK Waukesha motor without starting motor; 1—EKU Waukesha motor; 2—Buda's with starting motors, 180 HP.; two Climax motors 220 HP. 4—LeRoi Generator sets 32 KVA; thousands feet of 5/8" air hose, and welding hose. Contact 737 NO. Main, Enterprise Machinery Co. or 409 Bewley Bg. Phone FA-1620, Ft. Worth, Tex.

FOR SALE: SPEEDSTAR
71 Speedstar with or without truck and tools. Lloyd Cox, Elsmore,, Kansas.

BUDA Diesel Generator SET, new in crate. 31.25 K.V.A.—120/208 volt A.C. 3 phase 60 cycle. 1200 R.P.M. four wire 2 bearing with batteries, spares, alarm system, complete control panel and radiator. Ready to hook to load, self contained. $3650.00, F.O.B. Boston, Mass. General Agents Co., 5 Commercial Wharf.

FOR SALE SEAMLESS OIL WELL CASING AND TUBING

4000' New J-55 5½" O.D. 14# 8 R.T., R. 1 and 2 FOB Pittsburgh area
3000' A-1 Used H-40 5½" O.D. 14# 8 R.T., R. 2 FOB Central Michigan
3500' A-1 Used J-55 5½" O.D. 15½# 8 R.T., R 2 FOB Central Michigan
(Above two items 6 mo. old, stencils showing, thread protectors
1400' A-1 Used 10¾" O.D. 41.85# Drive Pipe 8 V.T., R-1 FOB Cen. Mich.
6100' New J-55 2⅞" O.D. 6.50# Ext. Upset 8 R.T., R. 1 and 2 FOB N. Cen. Ohio
4000' New J-55 2⅜" O.D. 4.70# Ext. Upset 8 R.T., R. 2 FOB Central Mich.
7000' A-1 Used J-55 2⅜" O.D. 4.70# Ext. Upset 8 R.T., R. 2 Central Mich.

LAP WELDED

2000' A-1 Used 8⅝" O.D. 24# 8 R.T. FOB Central Michigan

MICHIGAN CARLON PIPE CO.
20120 Livernois Detroit 21, Michigan
DIamond 1-1400

EQUIPMENT FOR SALE

FOR SALE: Used Drilling Equipment—1—L. R. O. Waukesha Motor mounted on skids with Clutch and Drive Pulleys and Steel Housing; 1—6 x 12 Wilson Snyder Pump powered with 1—L90 A.C. Motor with starting motor. All equipment A-1 Shape. Telephone 1227—Wampler Bros., Longview, Texas.

FOR SALE: IDEAL SLUSH PUMP
Model C-150
Melton Supply Co., Seminole, Okla.

NEW PIPE FOR SALE
3479 feet 3½ OD 13.30 Spang Sml. Dble. Seal Shrink Thd. EUE Drill Pipe Gr. D, Rg. 2W National Alloy EX Upset Shrink Thd. Tool Jts. 4¾ OD. This Pipe Has Never Been Used. Greeley Drilling Co., Inc., Wichita, Kansas, 4-2081.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: 40 H.P. Bettis steamer, Tanks and steamer cab, Tools, Conns, Steam hose. On 1948 2-Ton Chevrolet truck. Price $3500.00. Frank Jones, McPherson, Kansas.

One Cooper-Bessemer Type FWDR-8T Marine Type 8 cylinder (600 HP at 750 RPM) turbocharged full diesel engine with full complement of auxiliaries including: reversing mechanism, fuel oil filters, lub oil filter cooler and pump, gages, thermometers, governor, alarm signals, Maxim silencer, and air starting system. Can be converted to gas.

This engine was purchased new and placed in operation in June, 1948, and has operated approximately 7,400 hours. It has had top quality maintenance, is in excellent condition, and is available because the drive it serves is being electrified.

PRICE: $17,500.00

Address replies to:

MISSOURI PORTLAND CEMENT CO.
3615 Olive Street, St. Louis 8, Missouri

PIPE – TUBING – CASING ORDER NOW!

Quantity	Size	Approx. wall	Description
110,000'	1½" O.D.	.140"	Recond. Seamless Tubing, P.E., 14' & Over.
55,000'	2" O.D.	.145"	2.7# Recond. Seamless Tubing, P.E., 14' & Over.
35,000'	2¼" O.D.	.140"	Recond. Seamless Tubing, P.E., 14' & Over.
30,000'	2⅜" O.D.	.....	4# Good Used Lapweld Range 1 Tubing with New 11½ V-Threads and Collars.
10,000'	3" O.D.	.300/.375"	9.7# Seamless Tubing, P.E., 23'-26' Lengths.
100,000'	4" O.D.	.140/.160"	Recond. Seamless, P.E., 14' & Over.
5,000'	5½" O.D.	.....	15½# Good Used Lapweld T&C Range 1 Casing.
8,000'	6⅝" O.D.	.....	19.97# Good Grade Used Lapweld, Cleaned, Beveled Ends, 20' Random Mill Lengths.
5,000'	7" O.D.	.....	20# Good Used Lapweld Range 1 T&C Casing, 11½ V-Threads.
1,000'	8⅝" O.D.	.....	25# Good Recond. Casing, T&C, 8 V-Threads Range 1.
1,200'	10¾" O.D.	.....	32.75# Good Used Lapweld T&C Casing, Range 1 New 8 Rd. Thds. & 8" Long Collars.

THIS MATERIAL IS AVAILABLE FOR IMMEDIATE SHIPMENT, SUBJECT TO PRIOR SALE.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.

EQUIPMENT FOR SALE

FOR SALE: 17½" Oilbath Gumbo Buster Rotary Table. 2—6" Gumbo Buster Swivels. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Two Sullivan 37 special rigs mounted on International trucks, Waukesha and Buda drill motors, 1800 ft. Sullivan 2⅜ tool joint pipe 20 ft., two 900 gallon water tanks mounted on late model Chevrolet trucks, two 4 wheel rod trailers, two 260 gallon gasoline trailers. Equipment in top shape, used less than two years. Nothing additional needed to start drilling. Good supply extra parts. TRANS-TEX EXPLORATION CO. Box 558, Abilene, Texas. Phones 8130—2-7565.

FOR SALE: Complete refinery, absorption type, 35,000 bbl. capacity. Will sell as complete unit or by individual items. Complete inventory furnished on request. Contact W. W. Teer, Box 1351, Wichita Falls, Texas. Phone 2-1821.

GOOD BUY—8" COLLARS
28 lb. Line Pipe at Dallas.
Oilton Pipe & Supply Co., Oilton, Okla.

FT. WORTH SPUDDER Super D, chain driven sand reel, heavy duty steel mast, Hercules drilling motor. Complete including all drilling tools, fishing tools, casing elevators, spider and slips. Ford Bullnose truck with winch and gin poles, water line and casing. Now running and ready to go, near Tulsa. Home Buyers Realty Co., 1141 East 37th St., Phone 77178 or 77628, Tulsa, Oklahoma.

FOR SALE: At Oklahoma City, 13—Used #8500 Electric IBM Time Card Recorders with Card Racks—each $150.00. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

TRADE: OIL FIELD TRUCK, 1946 K-7 International. Equipped with Tulsa winch. Will consider oilfield pup trailer on trade in. Earl F. Wakefield, 307 Union National Bank Building, Wichita, Kansas.

FOR SALE: DRILLING MAST
1—96' Lee C. Moore Cantilever Drilling Mast. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: Galvanized Iron Pipe, diameters 1½" through 3" length 30" through 88" threaded for fill pipes or suction stubs for Gasoline Tanks. Armco Drainage & Metal Products, Inc., P. O. Box 1343, Atlanta 1, Georgia.

FOR SALE: 36-L Bucyrus-Erie Spudder, with L1-600 Cummins Diesel Engine, Unit skid mounted, 54' steel telescoping mast, with catheads, 5" to 7" tools, new lines, steel dog house, 3 K.W. Diesel light plant, steel structure and floors. All equipment practically new. Will furnish inventory on request. J. C. Shaffer, Inc., P. O. Box 4365, Oklahoma City, Okla. Ph. 6-9905.

250 HP Natural Gas Engine with Generator; 165 HP Gas Engine; Diesel Engines; Generators. I Buy, Sell or Trade. A. C. Askew, Box 3073, Whittier Station, Tulsa 8, Oklahoma. Phone 6-6120.

FOR SALE: 3500' of used 4½ drill pipe with 5¾" O.D. full hole tool joints. Melton Supply Company, Seminole, Oklahoma.

FOR SALE: One 5" x 8" Denver-Gardner FXX pump. Wm. M. Hanlon, Box 1724, Billings, Montana, Phone 93193.

FOR SALE: PIPE COUPLINGS, 2"—3"—4"—6" and 8"—Casing Couplings 5½" OD x 8 Rd. and 11½V. All new, perfect. Julius M. Fogelman, Reading, Pa.

FOR SALE: Three 1946 F. W. D. (4 Wheel Drive) Tractors. All in good condition. Low mileage. One having only 7,622 miles. Will sell cheap and will deliver. Write Heintzelman's, Inc., Box 3071, Orlando, Florida, or phone "Bob" at 3-3477 collect, Orlando, Florida.

EQUIPMENT WANTED

WANTED: Used spudder, either Bucyrus 33-W, or 24-L or Ideco No. 16, with or without tools. State age, condition, location, and price and inventory of tools if any in first letter. R. E. Skinner, P. O. Box 2939, Tampa, Florida.

WANT Buy 9 Field Tanks 20,000 to 80,000 Bbl. Cap. Darien Corp., 60 E. 42nd St., N.Y., N.Y.

HELP WANTED

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00 Oil Industry Mailing List, Box 2603, Tulsa Okla.

EXPERIENCED GEOLOGIST qualified for geological work in connection with reservoir engineering. Five years experience necessary. Experience in Permian Basin desirable. Box D-857, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Party chiefs, observers, computers for work in Canada. Minimum five years experience required. Do not apply otherwise. Give complete experience record. Box D-910, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST: Fully qualified and experienced for position of Chief Geophysicist with well-known contracting company. Application must state complete qualifications, references and salary expected. Box D-918, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOGRAPH PARTY CHIEF and Computer wanted by new aggressive company. Box D-920, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICAL SURVEYOR: Minimum two years' experience on transit; do not apply otherwise. Box D-921, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEERS
OPERATIONS SUPERVISORS
PERFORATOR OPERATORS
Only Experienced Men Need Apply
WRITE ONLY
WELEX JET SERVICES, INC.
3909 Hemphill Street, Fort Worth 9, Tex.

WANTED

Experienced A F E Clerk—Accounting background. Some oilfield experience necessary.

Title Clerk—Experienced or will train young man with LLB degree.

Production Clerk — Figure oil and gas runs. Execute Railroad Commission Reports. Must be experienced.

Excellent future with young independent oil company in the Gulf Coast Area.

Write giving complete employment record.

Box D-931, The Oil and Gas Journal,
Tulsa, Oklahoma

HELP WANTED

WANTED: Associate or full professor of Petroleum Engineering in a leading institution. Must have successful professional and research background. Work to begin September fifteenth. Box D-897, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERINTENDENT experienced in Petroleum Production, drilling and work-over jobs. Excellent opportunity with Independent Oil Producing Company. Please state age, experience, and give reference with first reply. Box D-913, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERVISORY PIPE-LINE ENGINEER

Experienced, professionally trained man, age 32 to 40, to head up pipe-line activities; including supervision of right-of-way, gathering system negotiations; pipe-line construction and pipe-line operation for a small but expanding system, with excellent prospects for substantial growth. Facilities in Texas and Louisiana. Please submit qualifications in confidence to

Box D-924, The Oil and Gas Journal
Tulsa, Oklahoma

ENGINEERS

Process (Chemical) Engineers
Construction Engineers
Project (Mechanical) Engineers

To Work On
Petroleum, Petro-Chemical and Chemical Projects

Write in complete detail, giving positions held, references, education, salary expected. Personal interview can be arranged.

Address Personnel Department
E. B. BADGER
& SONS COMPANY
75 Pitts St., Boston, Mass.

VACANCIES EXIST WITH MAJOR OIL COMPANY HAVING OPERATIONS IN SEVERAL SOUTH AMERICAN COUNTRIES FOR:—

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DRILLING ENGINEER

DISTRICT ELECTRICAL SUPERINTENDENT

Salaries offered are dependent upon qualifications and experience and are payable in U. S. Currency.

Interested parties should submit essential details of qualifications.

All replies, which will be held in the strictest confidence, should be addressed to:—

Box D-928

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

HELP WANTED

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

SITUATIONS WANTED

F. C. C. ELECTRONICS ENGINEER: 12 yrs. experience, age 34, veteran, family, desires Communications Supervisory Position Oklahoma area. Box D-917, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Married, 32, graduate of the University of Tulsa, one year petroleum production experience. Will consider any petroleum engineering position offering opportunity for advancement. Box D-894, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

QUALIFIED GREASE and LUBE OIL PROCESSING MAN desires change. Fifteen years of successful plant management; experienced in latest types of lubricants. Location unimportant if opportunity present. Box D-914, The Oil and Gas Journal, Tulsa, Oklahoma.

PHOTOGRAPHER: National Magazine Experience—public relation, scientific and intensive motion picture training—six years' experience. Would like employment with oil or allied industry. References and samples sent on request. Box D-923, The Oil and Gas Journal, Tulsa, Oklahoma.

CONSTRUCTION ENGINEER or Superintendent R.P.E. 30 years' experience refinery and general construction. Prefer large contractor operating in oil or defense construction, Mid-Continent or Southern area. Box D-922, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING and Production Superintendent: More than 25 years experience with one employer, in drilling, well completion and production operations principally in Kansas, Oklahoma and West Texas. Best of references. Immediately available. Box D-919, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Geologist, with major company experience in Permian Basin. Am interested in contacting an active independent in this area. Available immediately. Box 1826, Midland, Texas.

MATERIALS MAN, fifteen years office and field experience in purchasing, accounting, and general handling of oil field materials for production companies. Presently employed. Desire change for personal reasons. Box D-932, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST-LANDMAN. Wide and varied experience, now with major company and wishes to remain in Rocky Mountain Area. Capable of taking complete charge of operations. Desires salary-interest or will consider retainer basis. Box D-929, The Oil and Gas Journal.

COMBINATION PRODUCTION and Drilling Superintendent, age 40, Graduate Engineer with 18 years experience in the Mid-Continent, Gulf Coast and Permian Basin areas desires connection with substantial independent or drilling contractor. Applicant is thoroughly reliable, sober, and has reputation as a good well man at all depths. Applicant has also had considerable experience as evaluation engineer and has experience on drilling block trades, screening deals for the management, and in bidding in drilling contracts. Now employed. Salary open. Box D-930, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

GRADUATE PETROLEUM and Natural Gas Engineer: 25, single, one year experience, foreign or domestic work speak Arabic. Box D-915, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: Graduate engineer with fourteen years' excellent experience desires to change employment. Interested in production engineering in Mid-Continent or Gulf Coast states. Box D-927, The Oil and Gas Journal, Tulsa, Okla.

GRADUATE PETROLEUM ENGINEER: 4 years experience in drilling and workover desires employment in Mid-Continent area. 27 years old, single, non-reservist. Box D-916, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing. Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 418, 815-15th Street, N.W., Washington 5, D. C.

LEASE AND DRILLING BLOCKS

28,000-ACRE block of Oil and Gas leases. Interested in turning for small overriding agreement or cash. Lloyd J. Twibell, Orchard, Nebraska.

LARGE INDEPENDENT wants properties to repressure. Give full details and price for quick action. Box D-925, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, Drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

ONE-FOURTH interest 80 acres with new well. Produced over 22,000 bbl., 90 days. Price $12,500 for 1/16—no proration. Box D-926, The Oil and Gas Journal, Tulsa, Oklahoma.

PLANNING to develop a partly proven oil-gas field in Allegany County, N. Y. Interest may be had for cash or good used casing, drive pipe and well equipment. If interested, write for details. C. N. Wilber, Box 625, Westfield, Pa.

OIL Structures between Arlington and Haswell, Colorado. Limestone Anticlines on long arch trends. Three large basins have deep valley extending from those basins to the Arkansas Valley. Most of lands can be leased direct from landowners. Our family owns 13 quarter sections in one tract. H. L. Brown, 314 W. 14th St., Pueblo, Colorado.

ACTIVE N.M. OIL AREAS

We recommend to buyers leases & royalty located in Major Oil Co.; seismograph blocks, where deep wells are projected in S. Roosevelt, N. Lea & Chaves County, New Mexico. Details these potential oilfields on request.

W. J. PETERMAN, Geologist
Portales, New Mexico

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

FOR SALE

PROPERTY IN PARADIS OIL FIELD

St. Charles Parish, Louisiana

Hibernia Bank & Trust Company, in Liquidation is inviting offers for the purchase of certain of its interests in the Paradis Oil Field involving over

9000 ACRES

For particulars write:

Hibernia Bank & Trust Company, in Liquidation

Jasper S. Brock, State Bank Commissioner
Thos. B. Kennair, Special Agent
J. Edward McGuire, Liquidator
405 Baronne Bldg., New Orleans, La.

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Immediate Inspection——Get Our Offer Before You Sell

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Corpus Christi, Texas

API Pipe Threading With Latest Landis Machines

ROYALTIES

SPOT CASH PAID FOR PRODUCING ROYALTY. SMALL TO LARGEST BLOCKS IN SETTLED OR OLD PRODUCTION ONLY. Oil Specialists since 1934. GERBER & CO., 120 WALL STREET, NEW YORK.

WE will buy your producing override royalties and oil payments, no matter how small. Emray Oil Co., B. R. Irwin, President, 1045 Electric Bldg., Houston, Texas. Phone—Charter 3479.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Writ Harry S. Wright, Wright Bldg., Farmington New Mexico.

MONTANA ROYALTIES

Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

PRIVATE PARTY wants to invest up to $150,000.00 in producing royalties or settled production. Small or large deals considered. Box D-912, The Oil and Gas Journal, Tulsa, Oklahoma.

PECOS COUNTY ROYALTY FOR SALE

Under drilling block, now drilling. Have encountered two shallow pays. $60.00 per acre.

ALBERT E. WALKER
504 Hamilton Bldg., Wichita Falls, Texas

REAL ESTATE

ATTRACTIVE Lodge Oklahoma resort lake. Large beautiful two-story building, excellent condition. Five private bedrooms, sleeping porches for twenty, dining room seats thirty. Boat house, garages, 100 wood acres. Fishing, swimming, boating, recreation. $22,000 handles. Box 1403 SSS, Springfield, Mo.

PRODUCTION FOR SALE

PRODUCTION FOR SALE — By Owner
NET 42 BBL. ½ Working interest 123 acres Wilbarger County. 3 wells 2900 feet. All new equipment. Monthly net income over $3,000.00.

GRAY OIL COMPANY
306 First National Bank Building
Wichita Falls, Tex.—Tel. 7292

SERVICES

METER CHART COMPUTING
by INTEGRATOR METHOD

All work supervised by experienced personnel.

SPECIAL CHART AUDITS

JOHN P. SQUIER COMPANY
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BRAESWOOD CENTER
Houston, Texas

5500 square feet, second floor, air-conditioned office space, in building of outstanding design, available about July 1, 1951.

Adjacent to Shamrock Hotel, Texas Medical Center and new Prudential Southwest Home Office Building. An ideal location for Oil Operators, Insurance or Finance business, etc. This ultra modern Center will house the new Braeswood Postal Station.

Braeswood Center, Inc.

2265 W. Holcombe Blvd.
Houston 5, Tex.

BUSINESS OPPORTUNITIES

WELL ESTABLISHED British oil equipment and supply company with head office in London is interested in acting as European and Sterling Area sales representative for all classes of equipment and supplies connected with the oil and mining industries. Box D-886, The Oil and Gas Journal, Tulsa, Oklahoma.

NOTICE Capitol Investors: One oil property $1,750,000, pays $330,000 per year net; One producing oil royalty $40,000, pays $800.00 per month net. 33,700-acre ranch 85 miles north of Santa Fe, New Mexico, $12.50 per acre. All the mineral and oil and gas rights go with it. One ranch 101,000 acres, 15 miles from Santa Fe, 29,500 acres deeded land, balance lease. Price $368,750. Half the oil and gas and mineral rights goes with it. Charlie Priolo, 2301 West 6th, Amarillo, Texas.

LEGAL

Sealed bids will be received at the office of the Secretary-Treasurer, Charity Hospital of Louisiana at 1532 Tulane Avenue, New Orleans, Louisiana, on or before the 26th of March, 1951, at 10:00 A.M. for the lease of the sulphur, potash, oil, gas and/or liquid or gaseous hydrocarbon mineral rights in and to the following described tracts, to-wit: TRACT NO. 1—A certain tract or parcel of land being situated in Section 10, Township 15 South, Range 23 East, District of Barataria, Jefferson Parish, State of Louisiana, being more particularly described as follows: The most southerly third of the tract acquired by Charity Hospital of Louisiana in the succession proceedings, Docket No. 12043, 28th Judicial District Court, Jefferson Parish, and recorded in Book 137, Folio 37 of the Records of Jefferson Parish, Louisiana, being bounded in front by Bayou Barataria; on one side by land now or formerly belonging to the Roman Catholic Church and Canal Bank and Trust Company; on the other side by land now or formerly belonging to New Orleans Planting Company; and in the rear by a line extending at right angles from the boundary common to the tract herein described and Canal Bank and Trust Company land and extending southwesterly to the boundary of New Orleans Planting Company land, said line being a sufficient distance from Bayou Barataria to enclose one-third of the area of the tract acquired by Charity Hospital of Louisiana in the succession proceedings as hereinabove set forth, all of which is more fully shown on the plat filed with the Board of Administrators, Charity Hospital of Louisiana, containing 383 acres, more or less. TRACT NO. 2—A certain tract or parcel of land being situated in Section 10, Township 15 South, Range 23 East, District of Barataria, Jefferson Parish, Louisiana, being more particularly described as follows: The middle one-third of a tract acquired by Charity Hospital of Louisiana in the succession proceedings, Docket No. 12043, 28th Judicial District Court, Parish of Jefferson, recorded in Book 137, Folio 37 of the records of Jefferson Parish, Louisiana, being bounded on the south by a line perpendicular to the boundary common to the tract herein described and Canal Bank and Trust Company and extending southwesterly to the boundary of land belonging now or formerly to New Orleans Planting Company, said line being the northern boundary of Tract No. 1; on the west by land belonging now or formerly to New Orleans Planting Company; on the east by land belonging now or formerly to Canal Bank and Trust Company; and on the north by a line perpendicular to the boundary common to the tract herein described and Canal Bank and Trust Company and extending southwesterly to the boundary of New Orleans Planting Company and being located a sufficient distance from the southern boundary of this tract so as to enclose one-third of the tract acquired by Charity Hospital of Louisiana in the succession proceedings as hereinabove set forth, all of which is more fully shown on the plat filed with the Board of Administrators, Charity Hospital of Louisiana, containing 383 acres, more or less. TRACT NO. 3—A certain tract or parcel of land being situated in Section 10, Township 15 South, Range 23 East, District of Barataria, State of Louisiana, Parish of Jefferson, being more particularly described as follows: Being the most northerly one-third of the tract acquired by Charity Hospital of Louisiana in the succession proceedings, Docket No. 12043, 28th Judicial District Court, Jefferson Parish, Louisiana, being recorded in Book 137, Folio 37 of the records of Jefferson Parish, Louisiana, and being bounded on the south by a line perpendicular to the boundary common to the tract herein described and the boundary of land belonging now or formely to Canal Bank & Trust Company, said line being the northern boundary of Tract No. 2; on the west by land belonging now or formerly to New Orleans Planting Company; on the east by land belonging now or formerly to Canal Bank and Trust Company; and on the north by the south boundary of Section 4, Township 15 South, Range 23 East, all of which is more fully shown on the plat filed with the Board of Administrators, Charity Hospital of Louisiana, containing 383 acres, more or less. All bids to offer a cash bonus for a lease having a primary term which shall not exceed five (5) years. Minimum royalties shall be one-eighth (⅛) of all oil produced and saved; one-eighth (⅛) of all gas produced and saved or utilized; seventy-five cents (75c) for each long ton of sulphur produced and saved; ten cents (10c) per ton for all potash produced and saved; one-eighth (⅛) of all other liquid or gaseous hydrocarbon minerals produced and saved. Should lessee fail to begin the actual drilling (spudding in) of a well on the leased premises within one year from the date of the lease, the lease shall terminate as to both parties to the lease, unless on or before such anniversary date lessee shall pay a delay rental (which shall in no event be less than one-half of the bonus offered), which shall cover the privilege of deferring drilling operations for a period of one year. Upon like payments annually, drilling operations may be further deferred for successive periods of one year each during the primary term. The primary term of the lease shall be five years. The lease shall provide for the drilling of offset wells where necessary to protect the Hospital's interest and shall contain the provision against the assignment or sublease of the lease unless approved by the Board of Administrators, Charity Hospital of Louisiana. The Board of Administrators reserves the right of determining whether or not the shut-in gas clause is to be included in any lease drawn. The lessee shall have the right to enter into pooling or unitization agreements with respect to development of the leased premises subject to the approval of the Board of Administrators, Charity Hospital of Louisiana. Certified check, payable to BOARD OF ADMINISTRATORS, CHARITY HOSPITAL OF LA. for the full amount of the cash bonus shall accompany and be deposited with each bid and no bid or deposit may be thereafter withdrawn or cancelled; and the cash bonus thus deposited shall be forfeited to the Hospital by the successful bidder in the event said bidder does not enter into written contract within ten (10) days after the written lease is submitted to him for execution. Board of Administrators, Charity Hospital reserves the right to reject any and all bids and to grant a lease on any portion of the tracts advertised for a price not less than proportionate to the best bid offered for the lease on the entire tract. Board of Administrators, Charity Hospital of Louisiana at N. O.

Permian Basin

(Continued from page 139)

oped in open hole at 7,027-34 ft. where in 24 hours of swabbing it yielded 235 bbl. of oil, plus a small amount of water. Water was said to be decreasing during the last hours of the test.

The hole was deepened 10 ft. with cable tools, when the hole filled with oil and headed some oil. It was being swabbed at last report. Production has been natural. Top of the said was 7,025 ft. on elevation of 2,659 ft.

Honolulu Oil Corp. and Signal Oil & Gas Co. have completed their 1-mile south extension to the Ropes Pennsylvanian field of Hockley County. The well is the 3 Underwood. Completion potential of 2,928 bbl. of oil daily was based on an actual flow of 122 bbl. of oil an hour for 6 hours. The 3 Underwood is the sixth oil completion for the field.

New Ellenburger oil has been reported for southeast Tom Green County, 4 miles southeast of the town of Wall at Cities Service Oil Co. and American Republics 1 Mrs. J. V. Ketchum. On a 10-hour test from 5,696-5,725 ft., recovery was 60 ft. of mud, 2,280 ft. of oil, and 720 ft. of salt water. Drill pipe unloaded after about half of it had been pulled. Operators were to rerun the test to see if water had come from the lower packer. Following that, electrical surveys were to be run.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Garza County: Foster Petroleum Corp. 1 Justice Heirs, 19-6-H&GN, 2 mi. SE Justiceburg, TD 7,834 ft., elev. 2,304 ft., Strawn 7,394 ft., reef 7,414 ft., perf. 7,449-53 ft., IP pumped 155 bbl. 38°-grav. oil a day plus 50 per cent water.

Midland County: C. W. Murchison 1 Canon, 13-41-4S-T&P, 2 mi. NW Pegasus field, TD 13,190 ft., PB 12,956 ft., elev. 2,889 ft., Pennsylvanian 10,300 ft., Ellenburger 13,122 ft., final perforations 10,465-535 ft., IP flowed 480 bbl. 44°-grav. oil a day, 20/64-in. choke, GOR 1,680 cu. ft., TP 350 psi.

Upton County: Ted Weiner 1-17 F. A. Braden, 17-37-5S-T&P, NE corner of county, TD 7,180 ft., elev. 2,713 ft., Spraberry 6,972 ft., perf. 6,986-96 ft., IP flowed 452 bbl. 38°-grav. oil a day, GOR 535 cu. ft., TD 40 psi.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: The Texas Co. 1 Higginbotham, 5-31-3N-T&P, 12 mi. S Gail, dry, TD 7,898 ft., elev. 2,391 ft., Spraberry 5,505 ft.

Crockett County: Humble Oil & Refining Co. 1-E Alma Cox, 5-QR-GC&SF, dry, TD 8,668 ft., elev. 2,405 ft., Wolfcamp 5,160 ft., Strawn 8,300 ft., Ellenburger 8,460 ft.

Standard-Fryer Drilling Co. 1 W. R. Baggett, 43-OP-GC&SF, dry, TD 8,212 ft., elev. 2,644 ft., Ellenburger 8,045 ft.

Gaines County: Lloyd H. Smith, Inc., 1 Riley Tr., 19-H-D&W, dry, TD 4,980 ft., elev. 3,088 ft., San Andres 4,580 ft.

Hockley County: Nelson Bunker Hunt 1 D. W. Shropshire, 18-9-Donley CSL, dry, TD 11,500 ft., elev. 3,871 ft., San Andres 4,150 ft., Spraberry 6,680 ft., Dean 8,330 ft., Wolfcamp 9,050 ft., Pennsylvanian 10,400 ft., Mississippian 10,810 ft., Fusselman 11,280 ft.

Howard County: Spartan Drilling Co. 1 Currie, 25-31-2N-T&P, 2 mi. SE Luther, dry, TD 9,010 ft., elev. 2,644 ft., Spraberry 5,730 ft., reef 8,303 ft., Mississippian 8,910 ft.

York & Harper 1 J. J. Jones, 14-34-2N-T&P, dry, TD 9,679 ft., elev. 2,611 ft., Spraberry 6,660 ft., Dean 7,945 ft., Pennsylvanian 9,363 ft.

Kent County: Sunray Oil Corp. 3 R. L. Spires, 38-4-H&GN, dry, TD 7,238 ft., elev. 2,064 ft., reef 6,674 ft., Mississippian 6,918 ft.

Kimble County: Anzac Oil Corp. 1 W. E. Bolt, J. Dafner Sur. 59, 3 mi. W Junction, dry, TD 1,912 ft.

Pecos County: Lee O. White 1 Iowa Realty Trust, 9-10-H&GN, dry, TD 1,135 ft.

Runnels County: J. W. King 1 E. D. Michaelis, H. G. Bliss Sur., 9 mi. N Ballinger, dry, TD 4,506 ft., Ellenburger 4,440 ft.

Tom Green County: Ohio Oil Co. 1-A M. D. Bryant, R. F. Tankersley Sur., 2½ mi. S Tankersley, dry, TD 7,036 ft., elev. 2,062 ft., San Angelo 410 ft., Clear Fork 470 ft., Ellenburger 6,870 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Tide Water Associated Oil Co. 1 PD State, 32-16s-37e, recovered water blanket and drilling fluid on a 1-hour drillstem test in the Devonian from 12,484-518 ft., and was coring ahead.

Phillips Petroleum Co. and Atlantic Refining Co. 1 Denton, 11-15s-37e, had additional Devonian pay on the basis of a drillstem test from 12,417-66 ft. Gas surfaced in 2 hours and 18 minutes and recovery was 3,970 ft. of water blanket, 2,000 ft. of oil, and 6,476 ft. of oil and gas-cut mud.

Devonian production as a south extension to Denton field has been assured at McAlester Fuel Co. 1-A Pat McClure, 14-15s-37e. The well flowed 171 bbl. of 47°-gravity oil in 16 hours through 20/64-in. choke on a test to 12,321 ft., plugged back total depth. Drill-stem tests have indicated a possible 300-ft. pay section.

The Texas Co. 1 AN State, 22-14s-33e, flowed 68 bbl. of 43°-gravity oil in 1 hour on a test at 9,856-95 ft. and was waiting on potential test.

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California Fields

(Continued from page 134)

the 6,500-ft. sand in which 2 Honor Rancho was completed.

Another last year discovery, Ethel-D pool in old Midway Sunset field of Kern County, yielded its best producer to date. Discovered by General Petroleum Corp. 101 Ethel-D last November, the fourth well, 104-Ethel, was completed flowing at the rate of 400 bbl. daily. The flow was through perforations at 2,304-2,747 ft. in the McLure sand, substantially higher than the 2,705-2,869-ft. section produced in 101 Ethel.

With General Petroleum about to give the field a pipe-line outlet, operators in San Ardo field of Monterey County, Coastal California, are stepping up development activity. The Texas Co. is preparing to drill eight wells, and Jergins Oil Co. and Superior Oil Co. have resumed work. Containing about 60 low-gravity crude producers, the field has a large number of proven but undrilled locations.

CALIFORNIA UNSUCCESSFUL WILDCATS

Kern County, Carneros Springs area: Independent Exploration Co. 3 Hyde-USL, 3-29s-20e, dry, Carneros 3,178 ft., TD 4,358 ft., elev. 1,258 ft.

Southeast McKittrick area: Standard Oil Co. of California 68 Van Wert, 26-30s-22e, dry, TD 6,098 ft., elev. 1,038 ft.

Salt Creek area: Ferguson & Bosworth 1 Porter Community, 19-29s-21e, dry, bottomed in Salt Creek shale, Phacoides 1,020 ft., TD 1,150 ft.

Tejon Hills area: G. A. Grober 1 Grober-Anniversary, 10-11n-18w, dry, Santa Margarita 428 ft., TD 473 ft., elev. 1,097 ft.

Wheeler Ridge area: Hancock Oil Co. 61 35 KCL, 35-11n-20w, dry, TD 6,500 ft., elev. 1,532 ft.

San Luis Obispo County, Creston Anticline area: Crest Oil Co. 1 Ryan, 16-28s-14e, dry, bottomed in basement, TD 1,860 ft., elev. 1,350 ft.

Santa Barbara County, Cuyama Valley area: Richfield Oil Corp. 1 Lundstrom-Becher, 11-9n-26w, dry, Santa Margarita 3,485 ft., Monterey 5,790 ft., Saugesion 9,340 ft., Painted Rocks 10,952 ft., TD 10,434 ft., elev. 2,820 ft.

CALIFORNIA WELL OVER 12,500 FT.—MARCH 9, 1951

Ventura County, Ventura area: Shell Oil Co. 14 Shell-G. P.-Hartman Ranch, 22-3n-18w, flowed at the rate of 100 bbl. per day through perforations between 13,485 and 14,307 ft., TD 14,553 ft.

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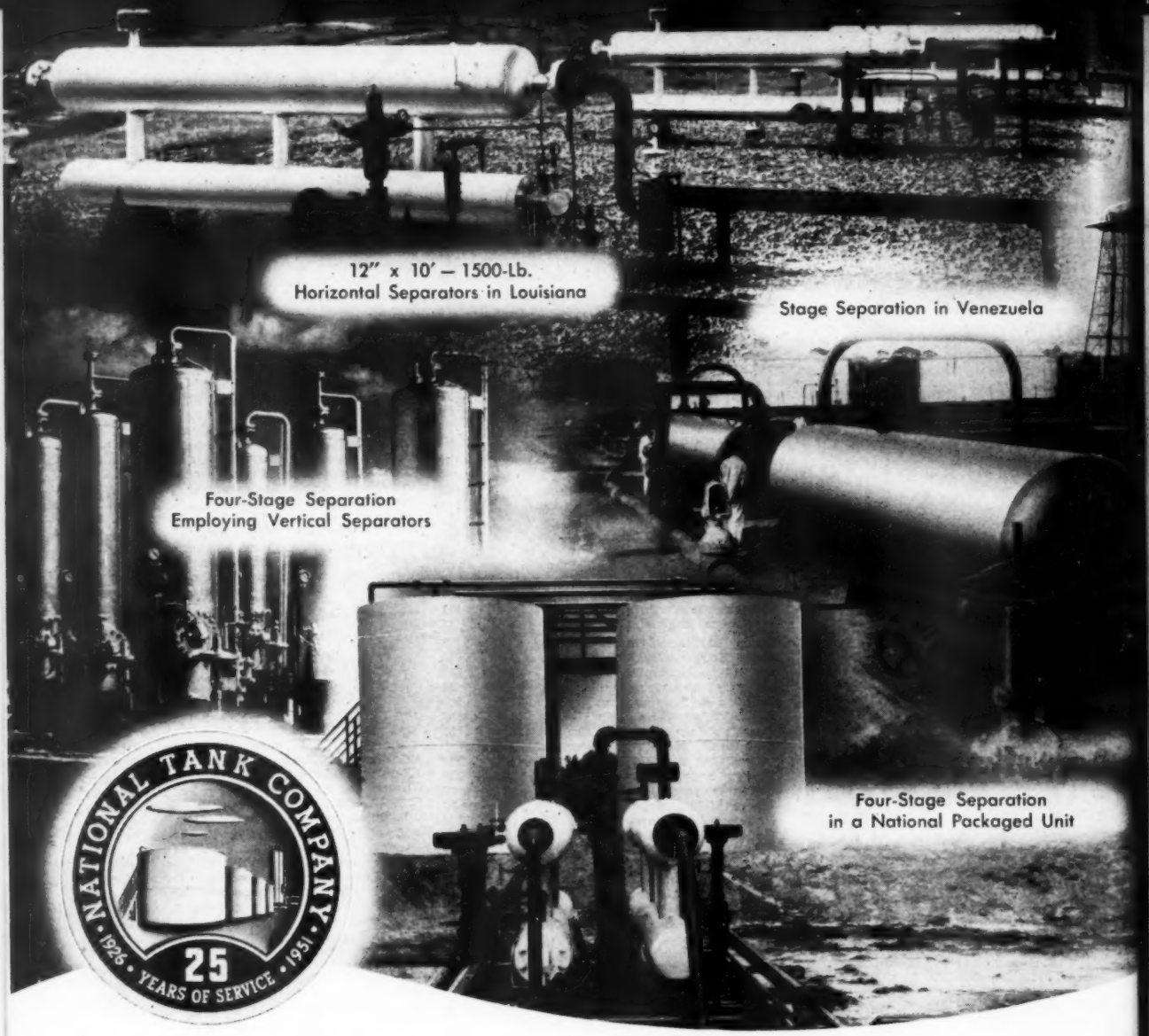

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The bundle of sticks

A wise old man called his quarrelsome sons about him. Taking up a bundle of sticks, he commanded each in turn to break the sticks. All tried, but in vain, and said it could not be done.

"And yet, my boys, nothing is easier to do," said the father, as he undid the bundle and broke the sticks, one by one. "By this example, you can see that united you will be more than a match for your enemies; but if you quarrel and separate, your weakness will put you at the mercy of those who attack you."

The useful truth of this fable is just as timely today as it was when the Greek ex-slave Aesop told it 2,500 years ago. You, a patriot, believing in individual liberty and freedom for all, see our American way of life threatened by the menace of communism abroad and jeopardized at home by complacence, negligence, confusion and incompetence.

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